T, SEPTEMBER 10, 1936

FIRST AERO WEEKLY IN THE WORLD

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SEP 22

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FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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Planting Acorns

THERE is a pathetic story of an old Admiral who had fought under Nelson, and who, in his retirement, planted an acorn every day of the proper season to provide oak trees for Britain's future "wooden walls." Just before he died, ironclad warships were introduced.

This story is recalled to mind by the gallant efforts of the two American men and the one English lady who have flown the Atlantic almost on the eve of the experiments to introduce a commercial air service across the Atlantic. Soon, we all hope, flying the Atlantic will be such a prosaic, every-week affair that private pilots who choose to make a pastime of it will need something far more sensational than a few thousand ping-pong balls to get themselves a headline in the papers. Still, if it amuses them to fly the Atlantic, no Government is likely to forbid them to do so.

The ping-pong balls stowed inside the American machine, however, need not be despised. They are an ingenious way of providing a vast number of minute watertight compartments. A rough calculation suggests that 30,000 of these little balls would support a weight of about 1,800 lb. in the water. That is but a small proportion of the empty weight of the Vultee, which is probably about 9,000 lb. In case of a forced landing in the water, the empty sealed tanks would do far more to keep the machine from sinking; but the ping-pong balls might keep both wings awash, which would certainly be some advantage. None the less, most people would prefer to make the crossing in one of the younger sisters of Canopus, to say nothing of the *Hindenburg*.

Mrs. Markham seems to have had a very rough and a far from enjoyable trip. That is likely to be a common experience on the route between Newfoundland and Ireland. She has proved herself a very fine navigator and instrument flyer, and though her flight teaches no serious lessons as regards air transport, she deserves congratulations on her pluck and skill. The feat is also a tribute to the qualities of the Vega Gull and the Gipsy VI, and as a result things look rosy for the chances of the Percival machines in the race to Johannesburg at the end of this month. It is to be hoped that this particular Vega Gull will be returned to this country in flying condition in good time to start from Portsmouth on Tuesday, September 29.

The Trackless Wastes

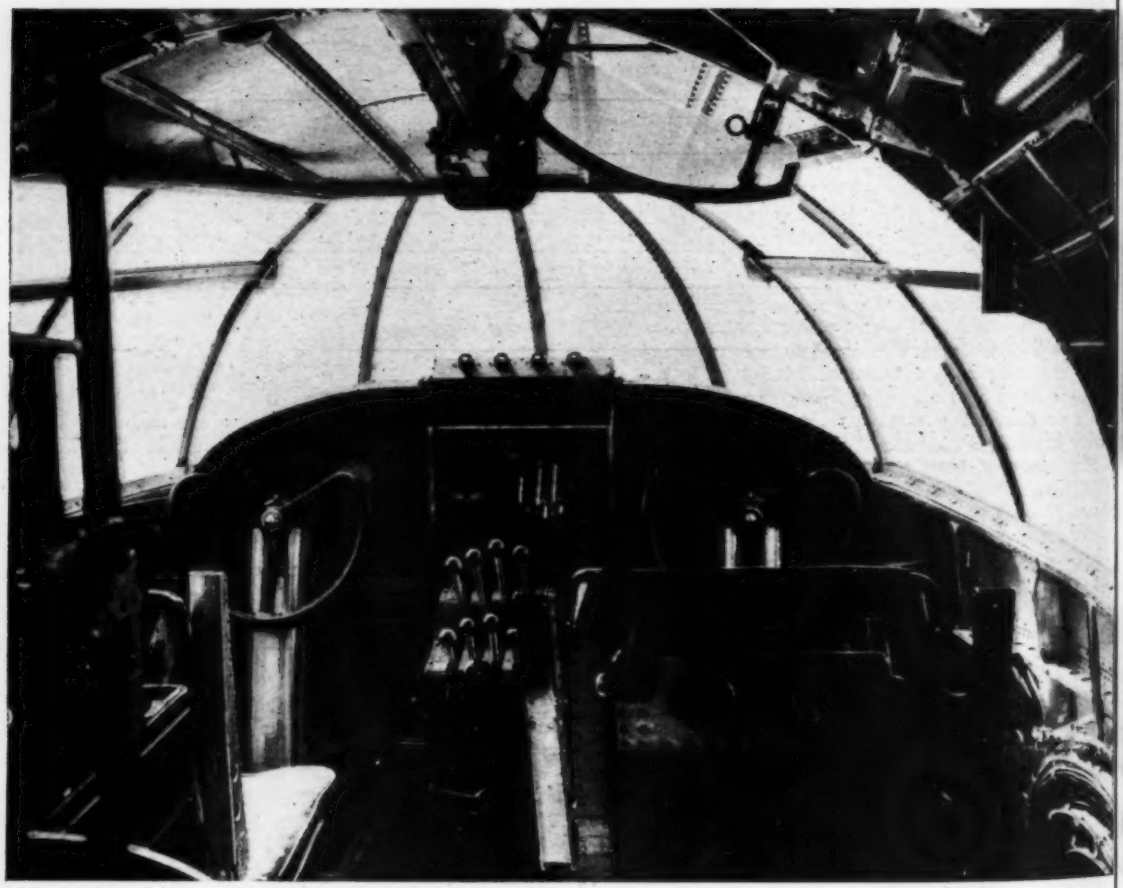
THE dangers of air bombing are now a frequent subject of conversation, and in truth those dangers are sufficiently great. It is therefore rather comforting to read an article (on pages 272a-272b of this issue) which points out some of the difficulties which the bombers will have to face while they are trying to destroy the civilisation of the twentieth century. From the enemy they can expect no weather reports or forecasts, and therefore they will have to rely largely on guesswork. Wireless directions would give away their own position and rob their raid of the element of surprise, and therefore it could not be freely used. The pilots cannot work like the sealers in Kipling's poem: "Half speed ahead by guess and lead." They would have to forge along in bad weather at 150 m.p.h. or more, trusting to "George" and dead reckoning. It does not sound an enviable task. Moreover, there are not an unlimited number of days or nights even in Western Europe when the weather conditions are quite ideal for bombing. The bombers would like sufficient clouds to give them cover, with occasional breaks below through which they can check their position, and occasional glimpses of the heavenly bodies, while at the same time the target must be clearly visible.

In any European war there will be aircraft on both sides, and what is bad for one side is also bad for the other, with certain reservations. It must be recognised, however, that the development of flying has been bad for Great Britain, as apart from the British Empire. When there were no aeroplanes, Great Britain relied for safety on sea power, and now she cannot do so. Great Britain, by herself, is more interested in air defence than in air attack, and so must count as an advantage anything which hampers the operations of all bombers. Even if the British Bomber Command were infinitely more efficient than that of the opponent, there would be poor consolation in that thought if the inferior enemy were able to do more serious harm to our Channel ports than our bombers were able to inflict on the enemy.

A beginning has now been made in locating certain important factories in the Midlands and the north-west. The mileage from the south coast would seem negligible for a fast modern bomber, but every extra minute which raiders spend inside the English coasts greatly increases the chances of the defence to intercept them. Moreover, it is comforting to read of the number of occasions during the Great War on which German raiders lost themselves badly when they came inland. On nights and days such as bombers would choose for their own protection, there will still be plenty of chances of missing the way over England, and the enemy will certainly be in complete ignorance of the progress of depressions from the West. On occasions when all air operations fail Britain will have the advantage.

It is pleasant to turn one's thoughts to other parts of the world where the coming of air power has added to the safety of the British Empire. Australia, for instance, can certainly be made safer by air power. The landing of a hostile force in the face of determined bombing attacks may now be considered impossible.

Ought we not even to seek comfort, instead of doubt and some discouragement, from the effect of the air arm on sea power? Naval writers maintain, and argue in convincing fashion, that the gun is, and always must be, the Navy's best weapon. We hope and believe that British naval gunnery will always be better than the gunnery of any future enemy. It follows that anything which makes gunnery more efficient will increase the power of our Navy in a fleet action. Spotter aircraft will certainly have this effect whenever the visibility permits them to work. Carriers may easily cancel each other out in a fleet action, and that would curtail the work of the fleet bombers and torpedo-planes on both sides; but so long as the spotters catapulted off the warships could direct the guns, the chances of turning a Jutland into a Trafalgar would be increased.



ON THE BRIDGE: The control cabin of the Short *Canopus*. In addition to the normal controls and instruments the Sperry automatic pilot switch-over and the airscrew pitch controls can be seen below the throttle bank, while the trimming controls are above the screen in the centre. An extraordinarily good all-round view is obtainable from the cabin. Other *Flight* photographs appear on pages 264-265.

The Outlook

A Running Commentary on Air Topics

A Century

THE use of fuel of 100 octane number for the Wright Cyclone engine in Richman and Merrill's Transatlantic Vultee is significant in that it heralds the production of such fuel on a commercial basis. Some startling claims have been made for its efficacy, even as compared with "87," and not the least attractive of its advertised properties is that in an engine developing 570 h.p. the specific fuel consumption can be reduced to 0.55 lb./b.h.p. hr., compared with a result of 0.70 from an engine using 87 octane fuel and operating at the same output, r.p.m., and cylinder head temperature. Under cruising conditions a reduction of from ten to fifteen per cent. is claimed. This means that the fuel load for a 1,400-mile range in a machine like the Douglas DC-3 would be of the order of 480 lb.

Perhaps the best example of how this new fuel can be used to increase speed is provided by Howard Hughes's landplane speed record of 352.388 m.p.h. It has been estimated that, had the Twin Wasp Junior been operating on 87 octane fuel, the speed would have been about 21 m.p.h. less.

Richman and Merrill have stated that their Cyclone used far more fuel than they had anticipated, but whether or not this was due to the nature of the "gas" has not been revealed. But, even should some of the claims for "100" have been over-optimistic, there are indications that it may come as a welcome blessing to the commercial operator as well as making increased performance available to the racing pilot and air force.

Not a Maid of All Work

THE command of the British forces in Palestine has been taken away from an Air Commodore of the Royal Air Force and has been given to a Lieutenant General of the Army. The latter is two degrees higher in rank than the former, for Air Commodore is only the equivalent to the Army rank of Brigadier. The senior officer naturally takes command. Up to the present time the Air Officer Commanding in Palestine and Transjordan (Air Commodore Roderic M. Hill, M.C., A.F.C., has just taken over from Air Vice-Marshal R. E. C. Peirse, D.S.O., A.F.C.) has been in command of all British forces, including Army units. The R.A.F. units in the Command comprise only Nos. 6 and 14 (Bomber) Squadrons and No. 2 Armoured Car Company, whereas the Army forces have been progressively increased as the trouble with the Arabs has steadily refused to yield to treatment. Now the complete First Division of the Army is under orders to leave Aldershot for Palestine. This division consists of three brigades, each of four infantry battalions, as well as ancillary troops, and naturally a very senior officer had to be placed in command. The choice has fallen on Lieutenant General J. G. Dill. The R.A.F. units will now come under his command, as previously the Army units were under the A.O.C.

Realities

NO tears need be shed by the R.A.F. over this change in command. It is due to a recognition of realities. No worse service can be done to the R.A.F. than to ask it to take over responsibilities which are beyond its powers. If it fails to do the impossible, as everybody does fail, then occasion is given to the enemies of the Force to exclaim, "I told you so!" The R.A.F. has proved in Iraq and other places that it can do some forms of work better than any other Service can do them. Partly for this reason, and partly because some enthusiasts are apt to exaggerate the powers of anything which is novel, there has lately been a tendency to regard the R.A.F. as Pax Britannica's maid of all work. The efficiency of air action, taken independently, depends very much on the terrain. Iraq has been proved an ideal sphere for its operations; and the same may be said of Aden and Transjordan. For an excellent description of R.A.F. work in Transjordan we may refer readers to the article on No. 14 (Bomber) Squadron in *Flight's* book, *Squadrons of the Royal Air Force*. Palestine is a different proposition. The first major disturbances there some time ago mostly took the form of riots in the towns, and aeroplanes are obviously not suited for dealing with them. The present troubles have included town riots, and have lately developed into guerilla fighting in the hilly country, and raids on roads, rails, and the oil-pipe line. The raiders have rarely presented a target for air action. Detailed skirmishing of that sort calls for Army troops, though air reconnaissance will still be most useful to the infantry.

An interesting question for the future is this: Will Palestine and Transjordan be separated in the future, and Palestine be left in the hands of the Army while Transjordan remains the care of the R.A.F.?

Paris as the Hub

A SECTION of French aviation circles intends to place Paris on the aeronautical map once and for all. The scheme is no mean one; it specifies an artificial lake just outside Paris from which the largest flying boats visualised could operate, and adjoining the lake there would be a splendid aerodrome with runways of about 1½ miles in the most useful directions. The seaplane base would provide take-off runs of two miles.

The initiative has been taken by the airports committee of the Aero Club of France, and after examining a large number of sites, the choice has narrowed down to two: One at Le Bourget East and the other near St. Quentin. It is the latter which is likely to be selected. With what is regarded as relatively little damming it is held that the St. Quentin Pond can be enlarged to give the take-off runs mentioned. The power necessary for the work would come from rivers in the Alps, hydro-electric plant being installed to raise the large quantities of water needed. The artificial lake would have an average depth of 25 ft., and the banks would be strengthened by special breakwaters to prevent damage by the wash from the flying boats taking off.

Situated south-west of Paris, the St. Quentin district shows an almost total absence of fogs, and by electric railway the new inter-continental airport would be within a quarter of an hour of the centre of Paris. The map published on p. 271 indicates that the artificial lake and the aerodrome would be on a plateau approximately 550 ft. above sea level, known as the Saint-Cyr plateau. To the north, the terrain slopes away steeply, and one wonders whether, with south-westerly winds, there would not be likely to be a down-draught just beyond the northern ends of two of the run-ways.

The scheme is fascinating in its magnitude, and contrasts somewhat sharply with our own efforts to come to a decision about the terminus of the new Empire air routes.

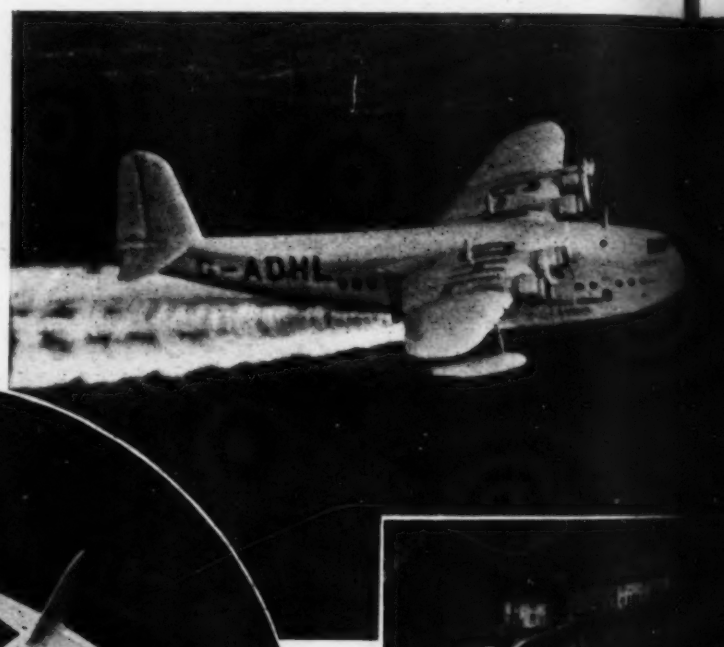
EMPIRE-BOAT PROGRESS

Some "Flight" Aerial Photographs : Quiet Cabins Contribute to Passengers' Comfort : Exceptional View for Pilots : Long-range Boat Ready for Tests

FEW things could be more inspiring than a visit to the seaplane works of Short Brothers at Rochester just now. The activity is of an order never before witnessed in a British flying boat factory. In addition to the twenty-eight boats which this firm is building for Imperial Airways, there is the Short-Mayo "Composite," with a lower component similar in a general way to the Empire boats, and an upper component in the form of a small four-engined monoplane with two floats, not to mention marine aircraft for the R.A.F.

Canopus, the first of the Empire boats, with which the initial flying tests were carried out some time ago, is in the hands of the upholsterers and internal decorators, who seem to be making a very beautiful job of the row of cabins inside the huge hull. *Caledonia*, the next boat in the line, is finished, so far as her externals are concerned, having had large extra tanks fitted in readiness for the experimental flights which are to determine her suitability for the Atlantic. On the stocks are numerous hulls in different stages of completion, some with the planking almost completed, others with bare patches through which can be seen the frames and stringers, and yet others which are bare skeletons. In the shops the small components are being turned out "like hot cakes" and assembled into units, ready to be erected on the stocks and wing jigs as soon as the earlier machines in the line move out. In a few weeks' time there will be a steady stream of these large boats, one going down the slipway every few weeks.

Although the *Canopus* is not yet completely finished



Canopus on the water and in the air.

internally, she has been out for further test flights lately, and *Flight* learns that the quietness in the cabins is something to be marvelled at. If a man shakes a bunch of keys in his pocket, the sound can be heard distinctly by people many feet away. In the pilots' cabin, too, the noise level is very low, although naturally higher than in the cabins. This is probably due to the position well ahead of the four Bristol Pegasus engines. During the take-off, with the De Havilland variable-pitch airscrews in low pitch, there *is* some noise, certainly; but as soon as the airscrews are changed into high pitch the noise becomes quite inoffensive. The view from the pilots' cabin is altogether exceptional. With the aircraft at rest on the water, the pilot can, without craning, see the surface up to within fifteen feet of the bows.

A good idea of this remarkable view may be formed from an inspection of the photograph on p. 262, which *Flight's* photographer secured earlier in the week. Seated well out in the bows, and with an almost hemispherical windscreen in front of them, the pilots can look in practically all directions except straight downwards. The added safety thus given must be very considerable.

Some of the photographs published here show the machine on the water. The photograph above shows a take-off, the clean running being well brought out. In the upper picture on the page opposite the machine is just alighting with the trailing-edge flaps down. Mr. Lankester Parker, Short's test pilot, did all the preliminary experimental flying on a Short Scion landplane (two Pobjoy engines) fitted with similar flaps, which were found to be very effective. They appear to be equally so on the large flying boats.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

A COMPLETE squadron of bombers with Junkers heavy-oil engines is in service with the German Air Force.

Hungary is said to have ordered sixty small fighter-trainers from Germany.

Arthur Gargett, who crashed at Portsmouth while, it was alleged, trying to fly an Airspeed Courier to Spain, died last Friday from tetanus.

Mr. Hore-Belisha, who, as reported last week, flew from Wilmington to Plymouth, is to learn to fly as a member of the Eastbourne Club, of which he has consented to become president.

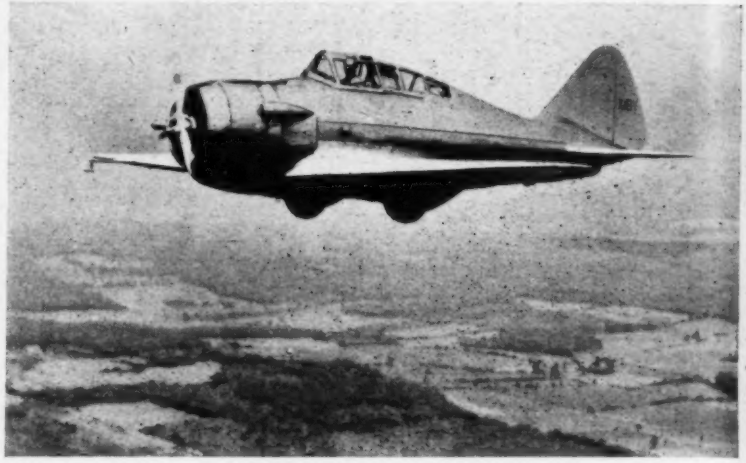
Flight regrets to record the death of Prof. H. Levy, whose investigations in hydrodynamics have been put to good account by designers of marine aircraft.

Colonel Roscoe Turner crashed last Monday week on a flight from Los Angeles to New York, receiving two fractured ribs, a wrenched back and internal injuries.

The Posts and Telegraphs Department of the Latvian Government has decided to order two D.H. Rapides for service on the newly established air route between Riga and Liepaja.

Flying a Caudron with a lady passenger, Maurice Arnoux is claimed to have set up a new record for aircraft weighing not more than 560 kg., flying over 1,000 km., with a speed of 248.5 m.p.h.

For his valuable work on behalf of French aviation, M. Chapuis, the very energetic secretary of the Society of French Aircraft Constructors, has received the Legion of Honour.



A SKY-SPLITTER: The new Seversky single-seater pursuit monoplane adopted as standard equipment by the U.S. Army Air Corps. Powered with a Pratt and Whitney Twin Wasp delivering something like 1,000 h.p. it seems, from all reports, to be quite a sound proposition but it is improbable that it reaches the standard of our new monoplane fighters either in performance or armament.

Members of the British aircraft industry who have come in contact with him will join *Flight* in congratulating M. Chapuis on this well-deserved recognition of his services.

The Dutch Government has ordered six triple-engined Dornier machines, presumably flying boats, for the defence of the Dutch East Indies. It is likely that thirty-six additional machines of similar type will be acquired and that half of them will be built under licence in Holland.

The Mascot aerodrome at Sydney will in future be called the "Kingsford-Smith Aerodrome," and that at Darwin the "Ross Smith Aerodrome."

Mr. Joe Jacobson, flying in the American Bendix Trophy race last week, is reported to have been hurled from his machine by an explosion, and to have descended safely by parachute.

Flight regrets to record the death, as a result of the crash in the T.T. races last Saturday, of Mr. William T. Thorne, A.M.I.A.E., F.I.M.T., who was well known in the Midlands as a lecturer on ultra-light aviation. Mr. Thorne was a distributor for the Kronfeld Super Drone.

GOSPORT CAMEO: A Blackburn Shark (Siddeley Tiger) and a Vickers Vildebeest (Bristol Pegasus) used for development work with torpedoes at Gosport. Both types (classed officially as torpedo bombers), although well established in service, are still in quantity production. Certain Vildebeests are receiving Perseus sleeve-valve engines. (*Flight* photograph.)

Twenty-five Years Ago

(*From "Flight" of September 9, 1911.*)

"The need of some form of brake as a standard part of the equipment of the aeroplane was more than ever emphasised by the mishap that overtook Lt. Cammell while landing at Hendon last Wednesday week. The following wind that had sprung up on the journey from Cambridge evidently upset his calculations somewhat, for although he commenced his *vol plané* quite early, and touched ground at least 200 yards from the sheds, the wind swept him forward, with the result that he charged the yielding doors of Hangar No. 1 at a speed of something like 30 miles an hour."

TRANSATLANTIC RECIPROCITY

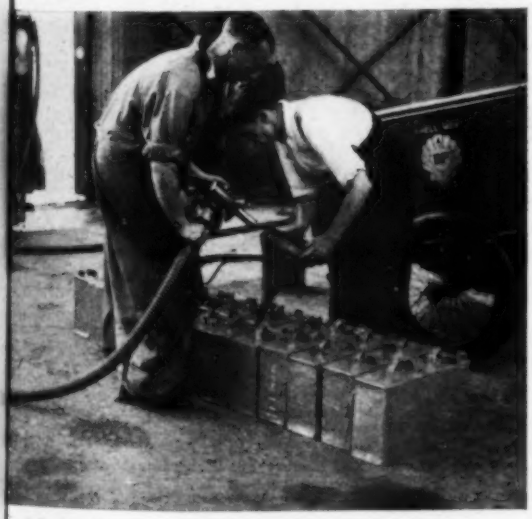
The Adventures of Mrs. Markham and the Richman - Merrill Team : The Vega Gull "Blooded" as a Record-breaker

The Percival Vega Gull (D.H. Gipsy Six), which bids fair to emulate the memorable feats of the Gull. Note in this view the large spinner over the hub of the Ratier V.P. airscrew on the Vega used by Mrs. Markham (inset).

THIS week *Flight* has to record two very courageous pieces of flying and attempts to draw no conclusion other than that Great Britain and America can produce very good aeroplanes and pilots.

On the dual consideration that the east-west flight by the Vega Gull was more meritorious than that in the reverse direction by a Vultee, and that the pilot was a lady, it will be given precedence, although chronologically it was started two days later.

Mrs. Beryl Markham, the heroine, is now thirty-three, and was taught to fly, in 1931, by Mr. Campbell Black in Kenya. After one hundred hours' flying she flew solo from East Africa to England in seven flying days, making two forced landings, one in the desert and the other in the jungle.



Shell-Mex fuel of 100 octane number being prepared for consumption by the Cyclone in Richman and Merrill's Vultee. (*Flight* photograph.)

The transatlantic Percival Vega Gull *The Messenger* is actually the machine entered by Mr. John Carberry for the Schlesinger Race. Its engine is a standard 200 h.p. De Havilland Gipsy Six, but drives one of the newly introduced French Ratier electrically operated variable-pitch airscrews, the hub of which is encased by an inordinately lengthy but business-like spinner. In the way of fuel tanks the Vega had two in the outer wing panels, another pair in the centre section and two more in the cabin, giving a total capacity of 255 gallons and permitting a range of the order of 3,800 miles. In all major respects the machine was standard.

After a certain amount of inevitable delay, Mrs. Markham took off from the R.A.F. aerodrome at Abingdon at 6.50 last Friday evening. In the larder were five flasks of tea and coffee and a cold chicken. Capt. Percival, in person, swung the airscrew.

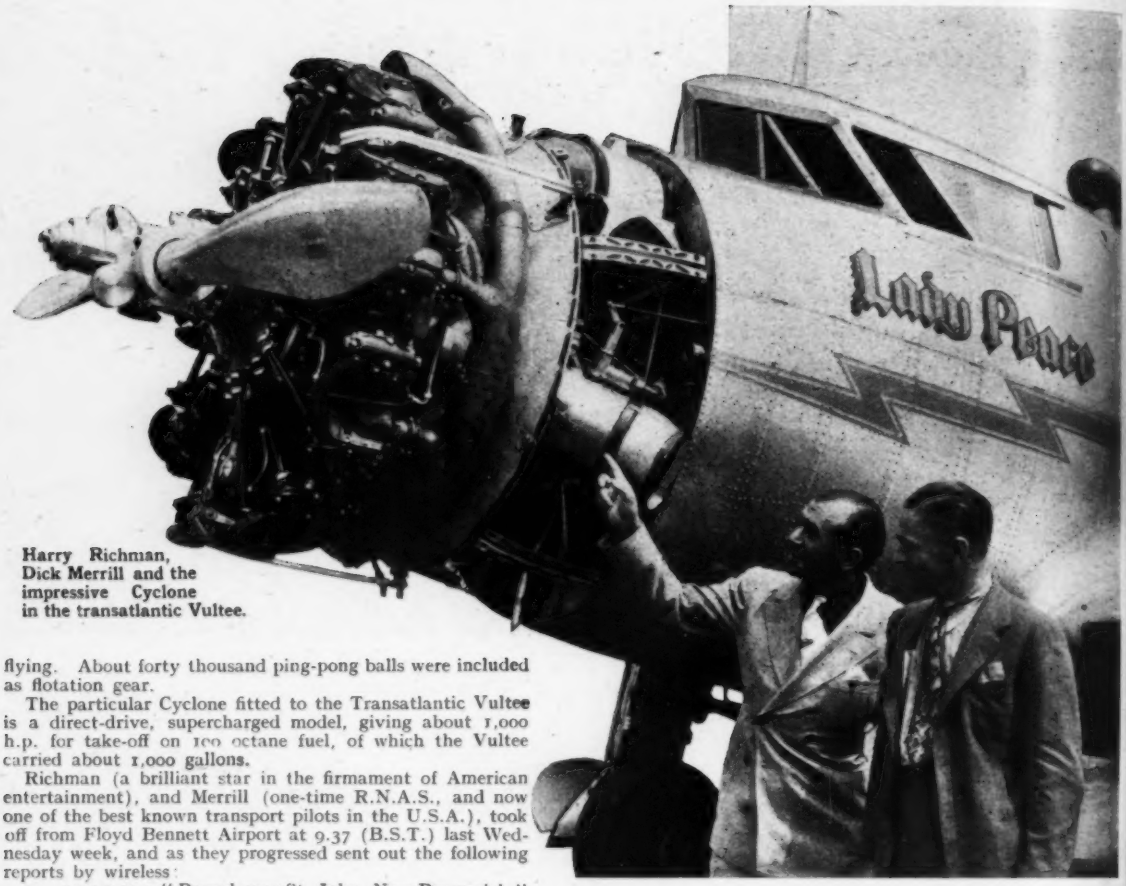
No wireless was fitted, so everyone just had to wait until the machine was sighted by a ship or it reached another land. After flying for about twenty hours Mrs. Markham found herself over Harbour Grace, Newfoundland, in a thick fog and with rapidly emptying tanks, much of her fuel having been used in a long fight against head winds. She made for Nova Scotia and set the Vega down at Baleine Cove, Cape Breton Island. It ran for about 40 ft. when its wheels sank into boggy ground, causing it to stand on its nose. After a two-hour wait, two fishermen arrived and took Mrs. Markham to their home, whence they 'phoned the glad news.

All the way across, said Mrs. Markham, the weather was bad, and for part of the way she was forced to fly by instruments.

On Sunday she was flown to New York and received a welcome of the variety in which New York specialises. Mrs. Markham's main, if not only, regret was that she was unable to reach New York as she had planned.

The following products figured in the flight: Castrol oil, Stanavo fuel, Reid and Sigrist and Sperry blind-flying instruments, Smith's instruments, K.L.G. plugs, B.T.H. magnetos, Claudel-Hobson carburetter, Salter springs, Weyburn camshaft, Dunlop tyres.

The flight of Harry Richman and Dick Merrill from Floyd Bennett Airport, New York, to Llandilo, South Wales, was of greater technical interest than Mrs. Markham's effort, mainly because the Wright Cyclone engine fitted to their Vultee V-1a transport monoplane *Lady Peace* was operating on fuel of 100 octane number. The V-1a is normally an eight-passenger machine and has been in regular commercial use in the U.S.A. for about two years. Structurally it is a cantilever low-wing monoplane with stressed skin metal covering, flaps and retractable undercarriage. The cabin is capacious, and dual controls are fitted, making it an attractive proposition for long distance



Harry Richman, Dick Merrill and the impressive Cyclone in the transatlantic Vultee.

flying. About forty thousand ping-pong balls were included as flotation gear.

The particular Cyclone fitted to the Transatlantic Vultee is a direct-drive, supercharged model, giving about 1,000 h.p. for take-off on 100 octane fuel, of which the Vultee carried about 1,000 gallons.

Richman (a brilliant star in the firmament of American entertainment), and Merrill (one-time R.N.A.S., and now one of the best known transport pilots in the U.S.A.), took off from Floyd Bennett Airport at 9.37 (B.S.T.) last Wednesday week, and as they progressed sent out the following reports by wireless:

12.5 a.m.: "Passed over St. John, New Brunswick."

1 a.m.: "We are over northern tip of Prince Edward Island. Our height is 9,000ft. The weather is foggy. We are having to fly by our instruments."

3 a.m.: "Flying over the ocean. Height 10,000 ft. Weather overcast. We estimate we have covered about 1,100 miles since starting."

5 a.m.: "All O.K. We are going to eat a sandwich."

6 a.m.: "All well. Flying blind at 10,000 feet."

7 a.m.: "O.K. Have covered 1,811 miles."

9 a.m.: "Estimate have covered 2,195 miles and are now 900 miles from Ireland."

Bovine Courtesy

They missed Ireland, and in circling to find their position used up most of the fuel remaining in the tanks. It seems that their consumption over the Atlantic had been very considerably higher than they had anticipated. The ceiling was low when they found Wales, and most of the eligible spots for a forced landing were thickly populated by cattle. Eventually Merrill spotted a meadow where browsed a bovine trio who subsequently proved considerate enough to allow the Vultee unobstructed landing space.

The crossing had been made in eighteen hours and, for most of the way, at 11,000 feet which, presumably, was the critical altitude for the supercharged Cyclone. Each pilot took two-hour turns at the controls (Richman is quite a seasoned flier), but Merrill made the take-off and landing.

The conditions of the crossing were not all that could have been desired, and the Atlantic was never in view for more than an hour at a time. Seven hundred miles from Ireland they met quite a terrifying electric storm, which put the wireless out of action and at another stage the machine fell for two or three thousand feet before the combined efforts of the crew could bring her back to an even keel.

On Friday, when taking off from the scene of the landing, Merrill showed particular skill in avoiding a news-reel van. The Vultee came on to Croydon by way of Bristol municipal airport and Filton aerodrome. The last stage, from Filton, was covered in 37 minutes, and *Lady Peace* was tucked up for the night in the Rollason hangar.

On Sunday Richman and Merrill flew up to Liverpool, and after an inspection decided to make Speke the starting point for the return trip. Thence they flew to Paris by way of Croydon and returned on Monday, intending to take off for New York on Tuesday.

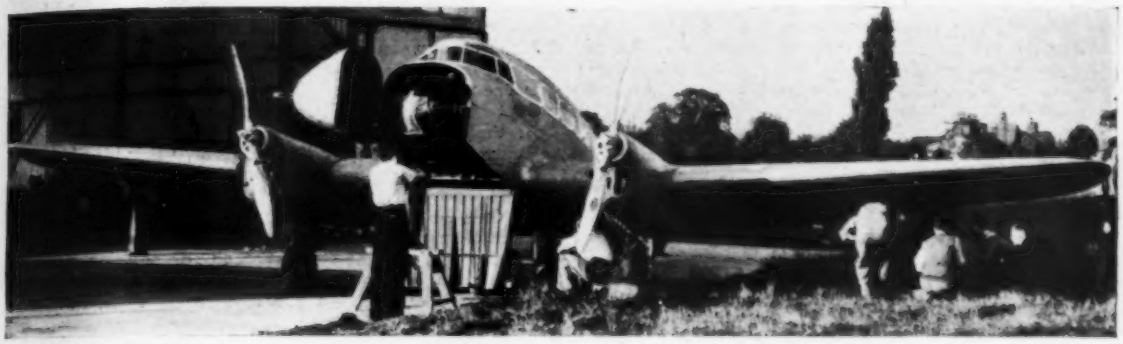
Forthcoming Events

September 12. London Aeroplane Club: Hatfield Garden Party.
September 12. Rochester Empire Air Week Final Display.
September 13. Aero Club de France: Coupe Deutsch Race.
September 19. Cardiff Aeroplane Club: London-Cardiff Race.
September 19. Three Counties Air Race, Hereford.
September 20. London Air Park Club: Display.
September 29. London-Johannesburg Race.
October 8. R.Ae.S. Lecture*: "Tapered Wings," by Dr. G. V. Lachmann.
October 22. R.Ae.S. Lecture*: "Economics of Airline Operation," by Mr. L. T. H. Greig.
October 25. Aero Club de France: Saigon Race.
November 12. R.Ae.S. Lecture*: "Skin Friction," by Dr. F. W. Lanchester.
November 13-29. International Aero Exhibition, Paris.
November 19. R.Ae.S. Lecture*: "Aerodrome Design," by Mr. Nigel Norman.
December 10. R.Ae.S. Lecture*: "Civil Flying Boats," by Mr. A. Gouge.
December 17. R.Ae.S. Lecture* by Prof. Melvill Jones.

*All R.Ae.S. lectures take place at the Royal Society of Arts, 18, John St., London, W.C.2, at 6.30 p.m. Admission is by ticket obtainable through a member

COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —



A "TWIN" IS BORN. The prototype Miles Peregrine light twin-engined transport with two Series II D.H. Gipsy Sixes and D.H. variable-pitch airscrews. Flaps and a retractable undercarriage are features. This is the machine to be flown in the Schlesinger Race by Flt. Lt. H. R. A. Edwards and Sqd. Ldr. B. S. Thynne. It is apparent from this, the first photograph to be published, that accessibility has not been neglected in the design.

THE WEEK AT CROYDON

"A. Viator's" Homing Device : Ping-Pong Across the Atlantic : Television in the Air : Another Spanish Scare

"AVIATOR" is on vacation, and would doubtless have it believed—at least among his Croydon comrades—that he is basking in the sunshine and society of the Welch Wiviera! You may rest assured, however, that such is far from fact, for, following in his sleuthlike footsteps, I have succeeded in culling the TRUTH.

I find that A. Viator has taken Ella Vator, and their son D. Viator, on a foot-slogging tour among the lesser known publicans who thrive in the Llans of Wales. It is further understood that they have not left their Cairns behind them, which is not surprising when it is recalled that A. Viator still lacks the qualifications of a "2nd N." His five readers may from time to time have noted that A. Viator is a specialist in Roman history, and one can foresee that, sallying off the beaten track as was—and indeed still is—the wont of Romans, these Cairns will prove an invaluable homing device to the A. Viator family, always provided that young D. Viator doesn't fiddle with Senior's calculations.

A. Viator has, for some weeks prior to his departure, been observed homing early, and on good authority has been training these interesting little animals to "stay put" every league, replete with Spratts' rucksacks; then, when D. Viator has reached the end of A. Viator's and Ella Vator's parental tethers, the trio "about turn" and, picking up their Cairns, are enabled to return with every facility whence they started.

Which brings me to the "highball" of the Croydon week, namely the anticipated—or oft-anticipated—arrival from the stratosphere of our good friends Mr. Ping and Mr. Pong [see page 261.—ED.] who have successfully "Vulteed" among the substratas across the Atlantic. Whether it was collusion or mere journalistic acumen twixt the Ping-Pong Boys and A. Viator is a matter for conjecture, but the facts are that both landed in Wales. Despite the reputed buoyancy of the former's cargo, however, it would seem that ice formation held them down to mere sub-stratosphere altitudes, and this, together with a bothersome fuel analyser, probably accounted in some measure for a higher consumption or lower cruising speed than was anticipated. Anyway, whatever the object of their flight, they were assured—and, indeed, obtained—a warm welcome, after their penultimate landing, at Croydon. After stating that what they saw of the Atlantic was *very* good, they denied having seen any Cairns in Wales, or that Mr. Pong had spent his time dropping ping-balls at predetermined intervals to alleviate their navigational anxieties on the homeward flight. Mr. Ping and Mr. Pong, incidentally, duly submitted with good grace to the theatrical antics of the stentorian voiced movie manipulators.

The Ping-Pong flight's early *atterrissage* resulted in good business for some of the charter companies, and one noticed that Personal Airways, Olley and Croydon Airways craft were despatched to the scene of replenishment, while from all reports, the Cessna (Holmes "up"), of Brian Allan Aviation, Ltd., was "first there."

His many friends were relieved to hear that Capt. Messenger and his Crusoe-family were rescued after their forced landing in *Horsa* in the desert. A most trying experience in which all appear to have acquitted themselves with credit and discipline.

A Veteran Passes

I am sorry to have to record the passing of Capt. Donald Drew, who was a veteran Imperial skipper, popular alike with his colleagues and his passengers. As he was "boating" on—or over—the Mediterranean for the major part of his career, he was not so well known to the younger generation at Croydon, but they will nevertheless join in in tendering sympathy to Capt Drew's relatives, for he bore his lengthy illness with fortitude and cheerfulness characteristic of the man.

Strange as it may seem, a large party of brewers flew over London with Surrey Flying Services, Ltd., last week-end, and presumably M.C. "Joe" Chamberlain had little difficulty in persuading them to take "hops"—giving them some of their own medicine, in fact. "Surreys," incidentally, are also busy with both English and Ameri-

can engine overhauls—in the latter case, with the kind assistance of Mr. Jack Gundlich, who is quite a character from the U.S. Wright people, since S.F.S. are doing the C. of A. of the Beechcraft "-LE.," which is also being "Rumbolded."

An interesting and possibly historic event was propagated on Friday afternoon when a K.L.M. Douglas took the air for the purpose of demonstrating Baird's Television transmission—with marked success from all accounts, Jessie Matthews' latest film being clearly televised from Alexandra Palace. An interesting probability in the course of the not-far-distant future is the use of a cockpit installation by which an airport can transmit its picture to a pilot flying "blind"; presumably there will need to be some form of "hook-up" with the infra-red ray scheme which has proved so valuable for long-range photography. On the other hand, one can picture the disconcerting results from certain passengers' points of view if two-way television becomes the rage in aircraft; for their sakes it is to be hoped that ground-to-plane only will be used, as we shall surely lose those happy reunions which are such a feature of airport life!

Genial "Bill" Bailey of Air Charter tells me that he did over sixty hours of Press work alone last month, and enquiries as to the health of his assistant "George"—the auto-pilot—revealed that with normal maintenance, he had just completed 1,000 hours of flying in the veteran D.H. Puss Moth.

In addition to the clock-like regularity with which their newspaper services are run, Wrightways, Ltd., have had some good charters, including a Continental tour to Ostend, Dieppe, etc.; at the former aerodrome, their Mr. Duggan experienced no little difficulty in getting clear as, on account of a Spanish scare, all craft were ordered to be detained—quite absurd, seeing that the aircraft not only bore the company's name, but, of course, had all documents in order.

One of Wrightways' Dragons, incidentally, piloted by Capt Holland, carried Professor Emerich Herzog (to whom A. Viator referred last week) on an oil-divining trip over Sussex. It seems that the Professor, using his silver rod, divined some super petroleum deposits near the South Coast, and that, although he never once looked out of the window, he was also able to tell others in the machine when they were passing over water. One does not vouch for the truth of the story that on one occasion, when he gave such information, his fellow passengers looked downwards and saw—a brewery. T. A. R. MAC.

RONGOTAI REORGANISED

Drastic Modifications to Make Wellington (N.Z.) Aerodrome Suitable for Increasing Commercial Traffic

Rongotai after completion of surfacing and extensions, June, 1936. On the left are the clubhouse and hangar and administration building of Cook Strait Airways, Ltd. The short traffic drive in the centre was once a street (named Kingsford Smith Street) which ran right through to Lyall Bay in the background. In the background, on the left, is Moa Point—the hill which, as a result of wind-tunnel experiments on a model of the aerodrome, is to be razed.

IT is doubtful whether any other Antipodean aerodrome has caused so much discussion as has Rongotai, at Wellington. Wind and weather play tricks at Rongotai that can be anything but amusing, and it is in the hope of eliminating, or at least reducing, these factors to a minimum that the present ambitious programme of alteration and development has been put in hand.

Rongotai, in its original form—when its use as a landing-ground was first decided upon in 1928—would hardly be recognised to-day. The aerodrome was officially opened in November, 1929, and the second stage in its history may be said to date from 1929, when it was taken over by the Wellington Aero Club. The development of commercial aviation may be said to have brought Rongotai to the third stage of its history. Actually, there was wide controversy over the suitability of Rongotai as a site, but an investigation by a technical committee of the Wellington Chamber of Commerce resulted in their strongly recommending it.

From the point of view of suitability as a commercial airport it was recognised that the site must be usable under all weather conditions, and there was the crux of the whole matter. Furthermore, large commercial machines required greater runways both for landing and taking off, and these the site was unable to provide within its boundaries as they then existed. The position was aggravated by bad air current bumps, and it was felt by those responsible for development that the only satisfactory method of arriving at a solution was to construct a model of the ground and surrounding hills which could be tested in a wind tunnel (this model was illustrated in *Flight* of January 30, 1936).

A number of tests in the tunnel proved conclusively that the slicing-off of the top of the hill known as Moa Point to a height of some 80ft. above ground, involving the removal of approximately 360,000 cubic yards of s, oil, would reduce very considerably the dangerous eddies round the summit of this point and the dead spot at and in the vicinity of its base. The valley on the landward side of the point, where very bad air currents exist, was shown to be greatly improved by filling.

On the basis of the findings, a report was submitted to the Wellington City Corporation, which, after no small amount of discussion, adopted a plan for gradual development on those lines. Work commenced in August, 1935. Runways of about 900 yards in a N.N.W. and S.S.E, and 660 yards in an East and West direction are to be provided.

By the end of June, 1936, the total area of the airport was extended to take in eighty-one acres, more than half as much again as the original site, and a Bill empowering reclamation work came before Parliament.

South American Re-equipment

FOLLOWING out their thoroughgoing replacement programme, Air France will in future cover the Buenos Aires-Santiago du Chili section of their weekly South American mail service with Potez 62s (two Hispano-Suiza liquid-cooled engines) which are arranged to accommodate ten passengers. These will replace the 95 m.p.h. single-engined Potez 25s which were formerly used. One of the new Potez has been tried out on the route during the past three months, and another is now on its way to join it. Their cruising speed is a comfortable 150 m.p.h.

The Buenos Aires-Santiago run is the highest regularly operated commercial air route in the world, crossing the 20,000-feet Andes.

Radio at Gatwick

THE D/F equipment at Gatwick airport is now in action between 10 p.m. and 7 p.m. nightly, except on Saturdays and Sundays. The call signs are "G J L" (W/T) and "Gatwick" (R/T), and the frequency is 363 kc/s (826 m.).

A Lorenz blind-approach beacon has been ordered and should be in operation at the beginning of the winter.

Air Mail to Islay

ISLAY took its first mail by air from Glasgow on September 4. Northern and Scottish Airways have been trying for almost a year to complete negotiations with the Post Office for an air mail contract between Glasgow and the Western Isles. On this day they were *requested* by the Post Office to carry to Islay a bag of mail which had missed the boat.

Portsmouth After All?

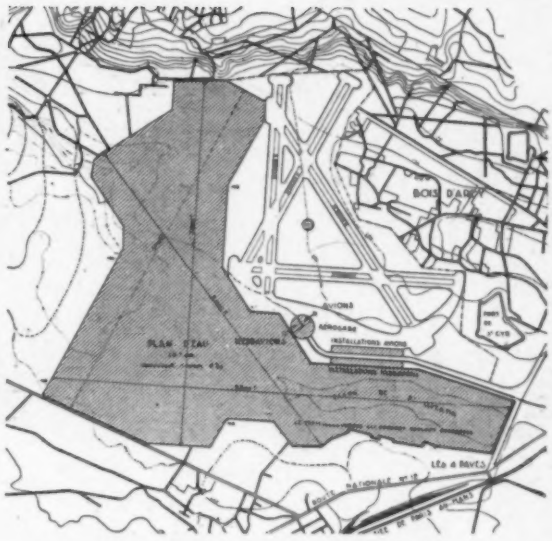
FOLLOWING Ald. Gilbert's offer of thirty-six acres of land adjoining Langstone Harbour, the Portsmouth Docks and Airports Committee has made another move in recommending the council to proceed with the work on the original terms. The council was expected to consider the recommendation on Tuesday of this week, and by now the result will be known.

Trans-Tasman

LAST week Mr. F. G. L. Bertram, former Deputy-Director of Civil Aviation, left by Imperial Airways for Australia. He will discuss the Empire air mail scheme with the New Zealand Government and give his advice on the trans-Tasman and trans-Pacific projects.

100 Per Cent. to Dublin

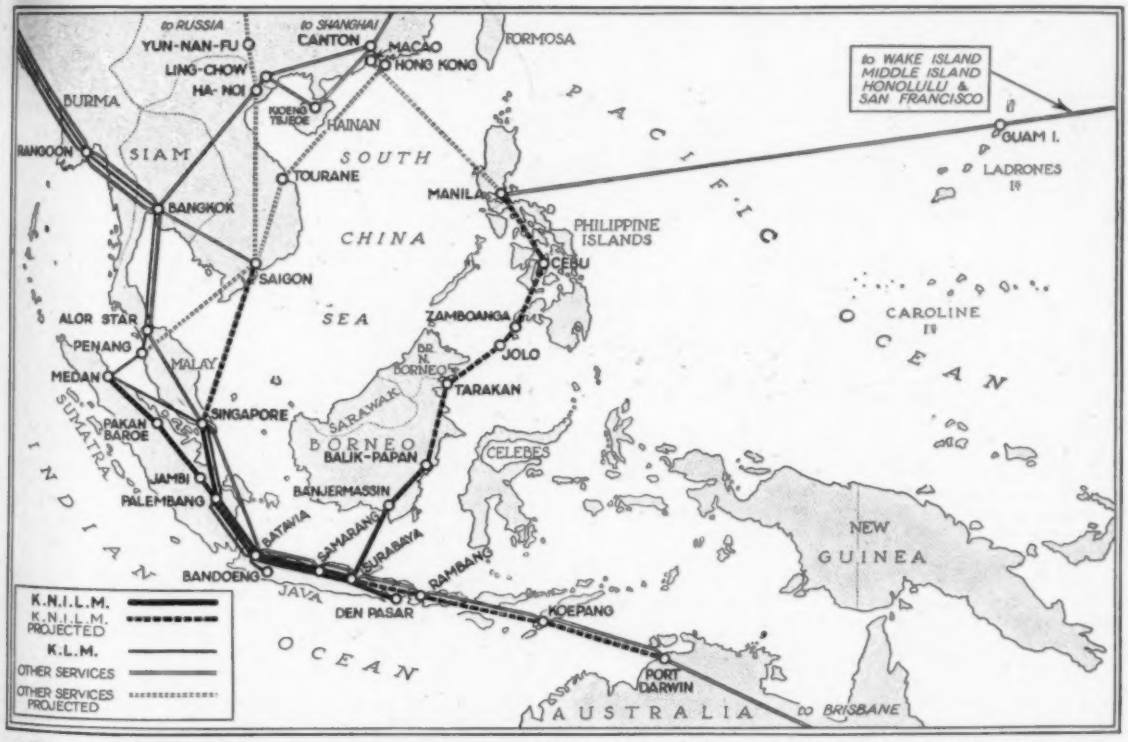
DURING August there were 963 commercial aircraft movements at Bristol Airport, carrying 1,500 passengers, including sixty-eight between Bristol and Dublin. This service has operated with 100 per cent. regularity since its inception on May 25. A teleprinter line, incidentally, is being installed between the Bristol and Cardiff airports, which will provide South Wales with access to the radio and meteorological facilities at Whitchurch.



A plan of the projected Paris land-water airport.

Artificial Seaplane Lake for Paris

IF plans examined by the airports committee of the French Aero Club materialise, Paris may become the centre of trans-continental and trans-oceanic air routes of the future. The scheme under review is rather breath-taking in its audacity and envisages the forming of an artificial lake on the Saint-Cyr plateau, south-west of Paris. Adjoining this artificial lake would be an aerodrome with runways parallel with the prevailing winds. The scheme is commented on in a paragraph on p. 263.



This map, compiled from information in the annual report of K.N.I.L.M. (Royal Netherlands Indies Airways), is interesting in that it reveals the comprehensive nature of the routes which that company operates, and also shows some enterprising extensions. When K.N.I.L.M. began operations in 1928 it flew 3,825 miles weekly; it is now covering some 14,000 miles weekly.

Correspondence

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for publication in these columns.

HONORARY FIRST-CLASS NAVIGATORS' LICENCES

IN your issue of August 27, your Croydon correspondent announces that the French Air Ministry proposes to grant honorary first-class navigators' licences to French pilots who have carried out ten successful crossings of the South Atlantic, and expresses the opinion that this is a gesture to be commended.

Apparently, your correspondent has overlooked the fact that these pilots crossing the South Atlantic with mails should, according to the International Convention, have been in possession of the first-class licence before carrying out these ten flights.

France is a signatory to the International Convention and has, therefore, agreed, not only that a first-class navigator shall be on board aircraft carrying passengers or goods for hire or reward more than 650 miles over the high seas, but also that these first-class licences are issued in accordance with the syllabus laid down in the International Convention. This syllabus includes astronomical navigation, which is not usually studied by airline pilots.

Very few arguments can be advanced against granting, in special cases, honorary second-class navigators' licences to pilots with considerable experience, as no great responsibility is involved. On trans-oceanic flights, however, considerable responsibility is placed on the navigator. Wireless sets have an unfortunate habit of breaking down at inopportune moments, and in such circumstances a knowedge of astronomical navigation is essential

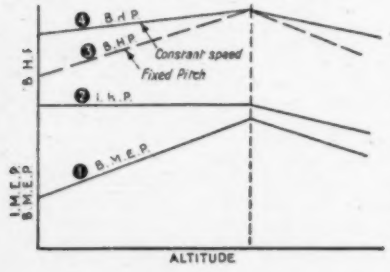
The granting, therefore, of honorary first-class licences is to be deplored, and creates an unfortunate precedent. I should be the last to argue that the studying of the syllabus laid down for the first-class navigator's licence ensures a pilot having the necessary practical experience for trans-oceanic flights but, on the other hand, the examination does ensure that a certain standard of knowledge is attained. C. W. MARTIN.

London, W.11.

CONSTANT-SPEED AIRSCREWS

HAVING read your very interesting article on "Constant-Speed Airscrews" in *The Aircraft Engineer* supplement of August 27, I feel the thrust h.p./altitude curve for constant speed is definitely at fault. This curve would not be flat for constant crankshaft r.p.m. and constant induction-pipe pressure. Constant manifold pressure up to the critical altitude, will give a constant Indicated M.E.P., but the Brake M.E.P. will gradually increase with altitude, as the mechanical efficiency (B.H.P./I.H P.) is increased. The mechanical efficiency increases with altitude, because the throttle is being gradually opened by the variable-datum boost control (or by the pilot) to maintain the same manifold pressure the power absorbed by the supercharger therefore decreasing as the restriction at the carburetter is reduced. The r.p.m. remains constant and the B.M.E.P. increases with altitude, therefore the torque and the thrust h.p. increases with altitude, although the manifold pressure remains constant.

Curve (1) shows increase of B.M.E.P. up to full throttle altitude, due to increasing mechanical efficiency; then falling off due to reduced charge density. Note that the B.M.E.P. falls off more rapidly than the I.M.E.P., due to the mechanical efficiency decreasing, because the losses are becoming a greater percentage of the input (I.H.P.).



Apropos his sketch, our correspondent remarks that the B.M.E.P. will vary very slightly as between constant-speed and fixed-pitch airscrews.

Curve (2) shows the I.M.E.P., which remains constant up to the full throttle altitude and then falls off due to the decreasing charge density.

Curve (3) shows the B.H.P. with a fixed-pitch airscrew (the thrust horsepower would probably vary a little differently due to airscrew efficiency), the power increasing with altitude due to (a) the increasing B.M.E.P., and hence torque output from the engine; (b) The increasing R.P.M., brought about by the increasing torque output from the engine, and the decreased airscrew resisting torque for a given rotative speed.

Curve (4) shows the variation of B.H.P. (the thrust H.P. would probably vary a little differently due to the variation of airscrew efficiency), with a constant speed airscrew, the reason having been stated.

For a supercharged engine rated at a given altitude at a given manifold pressure, there must be a sacrifice in power at low altitudes; the higher the full-throttle altitude the greater the sacrifice at low altitudes. With a fixed-pitch airscrew this loss is very great, but with a constant-speed screw is comparatively small.

The constant-speed airscrew shows up to great advantage during take-off, a high take-off power being obtained with a moderate boost, and therefore a comparatively low maximum pressure, and little tending to detonate; but the counteracting inertia forces are high. This high I.H.P. is backed up by a high air-screw efficiency, and therefore thrust H.P.

Take-off with a constant-speed airscrew is made with the R.P.M. held down considerably (this is particularly acute with very fast aircraft). High take-off power therefore necessitates a very high B.M.E.P., and in turn boost pressure. The maximum pressure is very high, and conditions from the viewpoint of detonation are the worst possible. The counteracting inertia forces are very low, so that the reciprocating parts are highly stressed on the firing strokes. To make matters still worse, the airscrew efficiency is low due to the blades being partly stalled.

A constant-speed screw is therefore an advantage from the engine point of view. D. D. FENTON SMITH.

Walton-on-Thames.

GROUND SIGNS

THOSE interested in the safe development of flying in this country naturally deplore the seeming reluctance of local authorities to provide ground signs for aeroplanes. Every care is taken to ensure the safety of road-users by the provision of an almost bewildering multiplicity of road signs, yet air-users, the safety of whose lives is equally worth ensuring, are neglected in this respect.

The safety of the flying man or woman, and that of their passengers, would be helped enormously by the simple use of a few pots of paint for the display of signs on the roofs of gasometers or other outstanding buildings.

We would be the last to suggest that the country should be splashed far and wide with garish signs for the convenience of flying people, but there could be little objection to those painted on the roofs of flat buildings since they would be visible only from the air.

Yet whose is the responsibility for safeguarding the interests of those in the air? If a village has a notorious "death-trap" on its road it surely feels its liability? In the same way do not cities and towns hemmed in by smoke-ridden skies make the air dangerous for pilots who are trying to find their way through visibility which is almost nil?

Local authorities, whether with or without aerodromes in their vicinity, usually feel they have no responsibility in the matter, yet a simple name sign-posting a town or village would not only be of inestimable value to pilots and help to ensure public safety in the air, but would prove also to be a tremendous municipal advertisement.

We sincerely regard those who fail to see their responsibility in this direction as failing in their duty to their own towns and to the public. AMY MOLLISON.

London, S.W. J. A. MOLLISON.

["Indicator," in his "Topics of the Day" in *Flight* of August 27, called attention to the need for such ground-signs. —ED.]

DETERMINED AGGRESSION

—By Bombers : The Importance of Weather Intelligence

By B. J. HURREN

What is the weather in three hours' time?

THE text-books thunder that the chief aim of an air force is to bomb. But quite distinctly, if timidly, the Muse of Meteorology can be heard saying: "Weather permitting." This meteorology, which has always been the Cinderella of aviation, may be a deciding influence in making an air force capable of bombing—without any riders to its basic maxim.

There are two main obstacles to the bomb raid: opposing fighter aircraft, whose value is calculable, and inclement weather, whose impediment is incalculable.

The capabilities for obstruction of fighter aircraft are controversial. There is much to be said for and against the fighter, but it is unsatisfactory to illustrate the pros and cons by quoting the exploits of pre-arranged demonstrations of fighter *versus* bomber, or by relying on the *dicta* of camera-gun experts. For both parties the records of camera-gun practices should be discounted, for it is not convincing to hear argument supported by photographic proof that a bomber's guns can shoot down an attacking pilot. One of the major attributes of a good fighter pilot is his hunting instinct. This gripping force is apt to be quiescent at the thought of a tame battle with cameras, conducted on pre-arranged lines for the ensuring of safety. The camera gun is excellent practice, but it no more resembles air fighting than coffee essence does a fresh brew.

This objection is two-fold. If the fighter's battle instinct is not stirred by the camera, neither is the bomber pilot so alive, so keyed-up, as he would be if pursued in affirmative rather than in negative manner. His determination to win through is sharpened by the thought of a fighter meaning business.

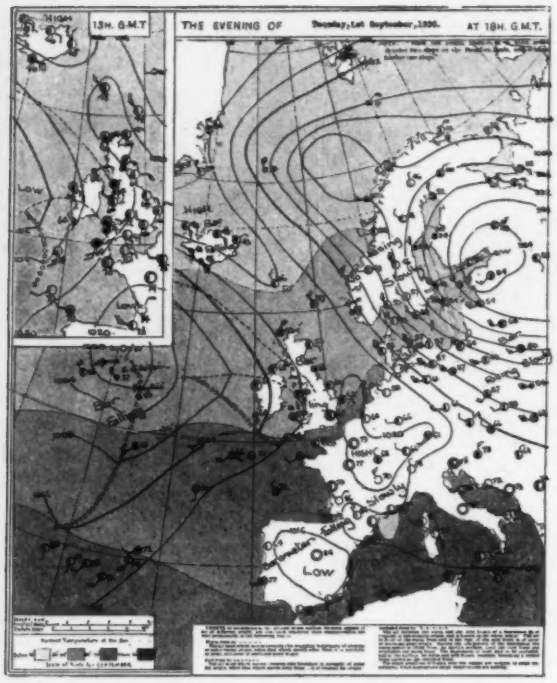
Blind Man's Buff

Consider these two in war. The bomber sets out with the definite object of determined aggression—he is going to get his mark. The fighter is equally determined to prevent him reaching his objective—he is going to get his man.

At once the fighter pilot is at a disadvantage. He has no notion whence his adversary comes. In the case of a night raid the fighter's information is reduced to a minimum, and at the best he is dependent on a ceaseless watch and a ceaseless patrol. There is the terrible strain of waiting, a prolonged period of inaction during which he must be tirelessly alert and endlessly inactive. If he is flying high the strain is intensified. If low, his inability to come to grips is aggravated. Night and day he is the one to accept this vitiating delay, for the bomber can choose his time and place. Though the weapons for the duel be the same, he can fly high or low, fast or slow, in cloud (theoretically, anyway) and approach from any of the thirty-two compass points.

These are the conditions of fighting, and it would seem on first sight that the advantage is decidedly with the bomber. With the balance set heavily in his favour, and with a determination to aggress, there is a negligible chance of the bomber being stopped. There is, worse still, only a small chance that the fighter will even have the opportunity of interception.

This rosy view of the bomber tones down to a deep pink when the incalculable considerations of the weather are remembered. It is not even accurate to say the bomber can pick his weather, for the simple reason that in a long flight the weather may change four or five times. Unless his weather intelligence is superb and his forecasts unnaturally accurate, he may find that the conditions under which he set out have completely changed during his flight, which, on an average, may be taken as of three hours' duration. Perhaps he has set off by night with the inconstant moon powdering the landscape; but



An immense amount of meteorological information is daily collected, as indicated by this typical Air Ministry daily weather chart for Western Europe. In the event of war much of this will be curtailed, and the value of a good forecast will be inestimable

(Reproduced by permission of the Controller of H.M. Stationery Office.)

this same make-up may be heavily veiled by nimbus cloud before his destination is reached.

It will be seen, then, that the Cinderella science of meteorology may soon have to be courted by all the princes, but it must be said at once that the widespread information now received by the weather chart compilers would not obtain in war. Much of the forecasting would be pure inference, and though it is still largely conjectural to-day it is conjecture supported by definite information.

One can see the increasing importance of accurate meteorological information for the use of long-distance raids and reconnaissances. That is a tempting question: Can an air force bomb? It has long been a valid objection of orthodox naval officers that the effectiveness of their air arm is largely reduced by its dependence on the weather; that it can only work on certain days when the weather permits. Is this objection valid for land operations? The current impression is that the declaration of war would be the signal for an immediate aggression by bombers of both forces. We have them pictured, straining at the leash, ready to fly off on a raid before the ink is dry on the proclamation of hostilities. Does this picture also include the supreme war lord saying: "No war to-day, gentlemen, the weather is simply terrible—even the birds are walking"?

It is, however, extremely difficult to say from weather records what is flying weather. It is easy to conceive water-logged aerodromes preventing flying on the most perfect flying day; and a score of similar objections. But taking a mean of the two great countries adjoining us, an interesting comparison is provided from the following tables which have been made up from meteorological records.

	Gales.	Fogs.	
ENGLAND (22 stations)	11 days	25 days	Yearly average.
FRANCE (20 stations) ..	12 ,,	23 ,,	
GERMANY (13 stations)	26 ,,	36 ,,	

This table shows that on the average Germany has worse flying weather than her neighbouring great Powers. The individual records of the capitals of all three countries are equally interesting

	Fog.	Rain.	Gales.	Snow.	
LONDON	41 days	167 days	—	13 days	Yearly average.
PARIS ..	46 ,,	157 ,,	58 days	25 ,,	
BERLIN	16 ,,	163 ,,	58 ,,	35 ,,	

This is the annual record, and whereas the English weather is spread out, the Continental bad weather is generally more in the winter.

Now, despite the adverse weather conditions, the bomber claims that by relying on his instruments he will brave all. He adds that the services of a crew assist him in bad weather, whereas his fighter opponent is more hindered than he by the inclemency.

Unfortunately, the experience of commercial pilots is not so reassuring. Admittedly, the commercial pilot has the interests of safety foremost, and the war pilot may be credited with a greater urge to get through. But the commercial pilot says frankly that wireless assistance is a necessity, and that flying on instruments alone cannot be sustained for prolonged periods, and certainly not for as long as three hours. Applying these lessons to the bomber, he must face either having his wireless jammed by the enemy or else betraying his exact position by his own wireless, which will be picked up by the enemy. In these circumstances it may be said confidently that instrument flying alone will not bring the bomber safely to his objective. Though it may be true that the bomber will never get giddy by doing good turns, it does seem he has a limited selection of days and nights on which to do any at all; that is, unless he concedes most of his advantages of time and place to the fighter waiting to intercept him.

It is quite an important point to bear in mind that rarely will raids be conducted by single aircraft. The value of instrument flying is not increased by having a number of aircraft in formation, for the following pilots cannot watch both their leader and their instruments.

Accurate Forecasts

This stresses the value of meteorological forecasts of an accurate nature. For the bomber to be most sure he requires certain conditions of cloud for protection and of height and visibility for his precision bombing. But these same conditions assist the lurking fighter, so that the inestimable weather factor is not so incalculable after all.

Incidentally, it is interesting to remember how the enemy secured their weather information in the Great European War. Before the war they relied on barometric pressures being reported, but this was withheld on the outbreak of war. It was therefore of paramount importance that some system should be evolved for an inference of barometric pressures in the west by studying the winds in the east. By a curious coincidence it was found that a remote group of islands in the north of Norway, the Lofoten Isles, provided a clue to all European weather. To this day this legend is supported, and on many occasions it is a most accurate guide.

However, it cannot be denied that the bomber can from weather forecasts pick his own conditions, though they may be limited in extent. Surprise is his strong suit, and this surprise is enhanced if he has reliable meteorological information. If the determination is present, it seems the bomber has a far greater superiority over the fighter in being able to exploit weather conditions to his own advantage, and against this the superior speed and armament of the fighter is reduced to very limited effect.

As in so many strategic considerations, it is the personal factor which tells in the end. The higher the morale of the bombers, the greater their determination to overcome obstacles. The task of the bomber is considerably lightened by the meteorological officer, and in the next war he will be a very overworked and most important gentleman. In fact, he and many others think he is already.

MOVING IN at FINNINGLEY

Expansion in Effect : No. 7 and No. 102 Bomber Squadrons Arrive in the Grand Manner to Take Up Residence at One of the Newest Service Aerodromes

By MAJOR F. A. de V. ROBERTSON, V.D.

EXPANSION! Expansion! Expansion! That cry fills all the thoughts of the Air Council. Government speakers in Parliament keep entertaining both Houses with lists of statistics—so many hundred pilots under training, so many thousand airmen enlisted, so many car firms making airframes and engines ("What is an airframe?" mutters the ordinary peer or M.P., but he fears to expose his ignorance by asking), so many first-line aircraft (and here each ordinary peer and M.P. forms his own opinion as to what really is a first-line aircraft, and all of them come to different conclusions), and so many dozen new aerodromes and stations under construction. The citizen in the street feels a bit happier now that he knows that expansion is really taking place, and hopes that somebody else will fill up the vacant ranks of the air defence Territorials. Some of them even wonder what this expansion looks like, and would appreciate a glimpse of what is going on behind the scenes.

On Tuesday of last week I witnessed some expanding. At Finningley, about seven miles from Doncaster, a great new aerodrome has been laid out. Fields have been bought, and the hedges between them have been levelled, the ground has presumably been drained, and a tolerable surface has been already secured. It will become better through use. Standing on the ground, it was hard to judge the extent of the landing area, but the trees beyond the most distant boundary looked very far away. Five new enormous hangars of steel and concrete are rising up, and most of them have the slates on their roofs. They are of the very latest pattern for the accommodation of heavy bombers, and are fitted with all modern conveniences. It will not, for instance, take all the men and boys of the station to open one of the hangar doors. In fact, I overheard one enthusiast picturing how, on receipt of a warning, someone would press a button, the doors would fly open, and the Heyfords would come streaming out, taking off as their wings got clear of the hangar walls.

Behind the hangars stands a camp of wooden huts, where for the time being the hardy lads of the R.A.F. will rough it a bit until the stately mess buildings, barracks, and quarters shall arise. Embryo roads and contractor's debris fill the intervening spaces. And, as Finningley's crowning glory, there is to be a special building for use as church and cinema, where chaplain and Chaplin will hold the stage in turn.

Finningley is but one of a number of R.A.F. stations which are springing up in the North. Already Lincoln and East Anglia are composed mainly of tulip fields, aerodromes, and golf links, and now it is the turn of Yorkshire. There are several good reasons for stationing heavy bomber squadrons far away from the London area.

Finningley looks as if it would accommodate a complete squadron of Heyfords in each of its five huge hangars, but for the present its garrison is to consist of Nos. 7 and 102 (Bomber) Squadrons from Worthy Down. This expansion is

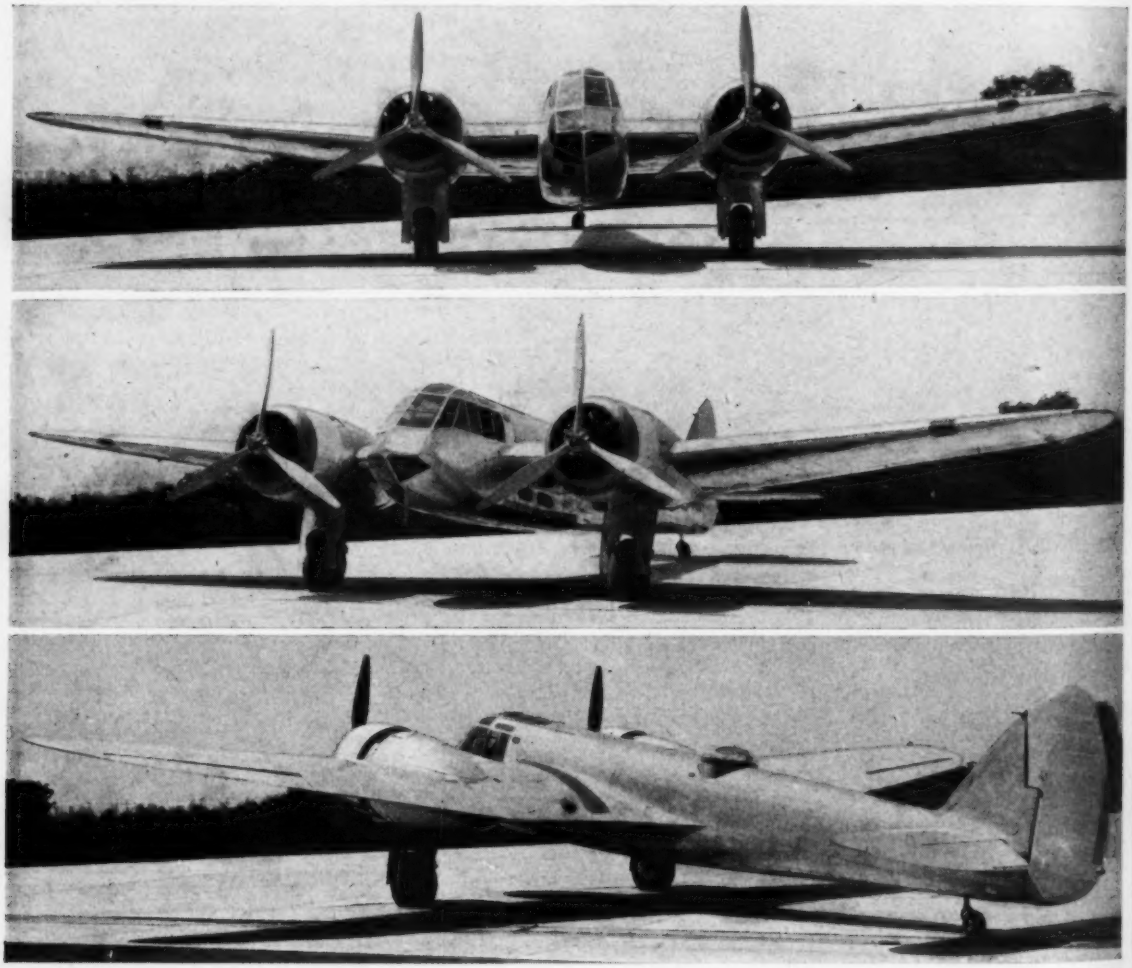
Farewell to Worthy Down : Heyfords on the way to their new home at Finningley

breaking up many happy old connections. Since 1924 until quite recently No. 7 B.S. shared Worthy Down aerodrome with No. 58 B.S. They became like sister squadrons, and they more or less took it in turns to win the Lawrence Minot Trophy. But the needs of expansion broke up this happy family. Not long ago No. 58 was moved to Upper Heyford, and each of the sisters proceeded to take up maternal duties. No. 58 B.S. gave birth to No. 215 (Bomber) Squadron, while No. 7 B.S. likewise became the mother of No. 102 (Bomber) Squadron. On Tuesday last No. 7 B.S., dutifully accompanied by her daughter, cut the last link with Worthy Down by flying up to Finningley, while Nos. 58 and 215 B.S. have likewise migrated to a Yorkshire aerodrome at Driffield. Certainly they will have more elbow room in their new quarters. Worthy Down is on the small side for heavy bombers, and is much more suitable for Hinds.

Early last year the time-honoured Virginias at Worthy Down were exchanged for Heyfords, and so when one flight of No. 7 B.S. was detached to become the nucleus of No. 102 B.S., both were equipped with the modern type of heavy bomber. Since then each squadron has been built up to full strength. Each has ten first-line Heyfords and two in reserve, and each has a full complement of pilots. Last Tuesday, however, happened to be not the most easy of dates for squadrons to change quarters. The leave season is not yet over, and the squadrons were short of pilots. It was necessary to send up one flight from each squadron to Finningley, and then to fly a batch of pilots back to Worthy Down to bring up the machines of the other flight. Incidentally, readers may be reminded that squadrons with multi-engined aircraft are organised in two flights of five machines each.

Then on Tuesday there was very nearly a break in the spell of fine weather which had come in late August as a glorious change after many weeks of very gloomy summer. It was fine at Winchester when the flights set out, but soon they found low clouds above their heads, and as there was no hurry, one flight of No. 7 B.S. decided to land at Halton and wait there for a bit. One Heyford of that squadron, which was not flying in the formation, worked round the low stuff and arrived at Finningley a few minutes after noon. It was followed shortly after by a formation of four Heyfords of No. 102 B.S., which gave quite a sensational display. They broke formation with a very good Heyford imitation of the "Prince of Wales' Feathers." The pilot on the left of the leader, who was, I was told, the same man who looped his Heyford at the Hendon Display last June, went up in a particularly spectacular stalled turn, in which he seemed to throw his heavy bomber rather over the vertical, and then dived angrily, as it seemed, at the little group of spectators below him. The flight then "followed my leader" round the aerodrome, and landed one machine after another in the normal way. But it would not have surprised me if No. 102 B.S. had flown up with wings looped together and had landed in formation. There is room for it at Finningley.

And so another R.A.F. station has come into being. It lies in good flying country, and the delights of Doncaster are near at hand. These two squadrons have arrived in good time for the St. Leger. I hope they will all back the winner.



A PIPPIN: The Prototype Bristol Blenheim medium bomber with a pair of the latest Mercury engines, which give 840 h.p. at 14,000 ft. The Blenheim is a direct development of the cabin monoplane *Britain First*, built for Lord Rothermere and presented to the R.A.F. It is almost certainly the fastest twin-engined bomber in the world

OTHER PEOPLE'S IDEAS

Recent Aeronautical Patents Reviewed and Described

IN dual-control machines, particularly those used for instructional purposes, a system of braking controls has been devised whereby the instructor can at all times override the pupil in any brake applications he may make. The present patent describes a method by which this can be accomplished and in which the apparatus necessary is extremely compact and also simple in construction.

The method is shown applied to cable-operated brakes, and the cables from the pupil's controls are connected to the brake-operating cable by a trip catch. This trip catch can be disengaged by the instructor, after which the brakes can only be operated from the instructor's seat. The trip catch can again be engaged to render the brakes operable from either of the two control positions.—*Patent No. 449702: Bendix, Ltd., and A. W. Lambert.*

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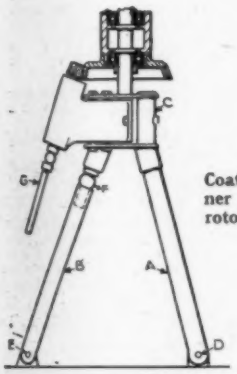
WHAT is claimed to be an improved design of the structure on which the hub of the rotative wing system of an Autogiro is mounted aims at securing lightness and minimum drag with adequate strength and rigidity.



Coats and Hafner Autogiro rotor mounting.

The structure consists of a tripod arrangement in which the two rear struts, one of which is shown at A in the illustration, are fixed to the hub C and pivoted to the body, as shown for strut A at D. These struts act as bending members or cantilevers and take the torque from the rotor drive. The third strut is shown at B, and this is pivoted to the body at E and to the hub by the ball and socket joint F. The length of this strut is adjustable by any suitable means. The torque is transmitted from the shaft G through the bevel pinion and crown wheel to the rotating wing system.

In order to take the torque from the rotor device it is necessary that the rear struts should have greater strength in the fore-and-aft direction than in the transverse direction; this enables them to be of such a streamline form as to reduce drag.—*Patent No. 448704: A. G. Coats and R. Hafner.*

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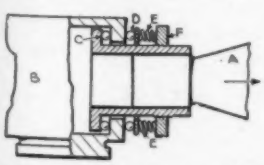
AN improved mounting of airscrew blades on the hub is dealt with in this case. The blades are capable of rotation about a longitudinal axis so that their pitch may be varied, and in order to reduce friction the mounting is effected by two ball bearings arranged behind one another. In use the centrifugal forces developed in the blades tend to reduce the load on one set of ball bearings and increase it on the other, and the arrangement described in this patent aims at overcoming this tendency. The illustration shows in diagrammatic form the principles involved.



The Schwarz V.P. airscrew blade mounting.

A is the airscrew blade and B is the hub, and between these are mounted two rows of ball bearings C and D. The latter row is spring loaded by means of springs E, the strength of which can be varied by adjustment of nut F. Without the spring loading the action of the centrifugal force on the blades in the direction of the arrow will tend to increase the load on the bearing C and decrease it on the bearing D. If, however, a suitable initial spring strength acts on bearing D there will always remain a load on both bearings, and end play, that might otherwise develop, is eliminated. A scheme showing a more practical embodiment of the invention is also given.—*Patent No. 448361: Gustav Schwarz G.m.b.H.*

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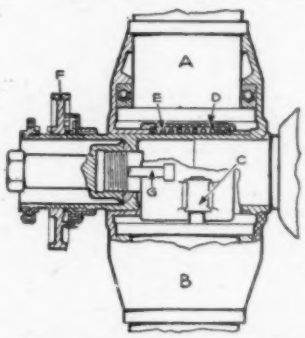
THIS patent covers an airscrew whose pitch is automatically varied by the engine speed, and there may be in addition a manually operated adjustment for limiting the range of pitch adjustment. One form of incorporating the device is shown in the illustration. The blades A and B of the airscrew are mounted on ball bearings and are capable of rotation about a longitudinal axis. Each blade is fixed to a crank-pin C, which is so connected to the sleeve D that sliding the sleeve along the main axis of the airscrew varies the pitch of the blades. The spring E moves the sleeve into that position which gives the maximum pitch of the blades. A flywheel F is screwed on to an extension of the airscrew boss to which suitable stops are provided. The rod G, which is attached to the sleeve, normally abuts against the flywheel.



Milner automatic airscrew hub.

As the speed increases, the tendency of the blades is to change so as to reduce the pitch, and this is controlled by the movement of the sleeve, which, in turn, is governed by the axial movement of the flywheel on the shaft caused by variation in speed.—*Patent No. 449247: H. L. Milner.*

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A FORM of undercarriage for light aeroplanes is described in which the landing wheel is journalled on a hollow axle. There are two struts which are pivotally mounted to the fuselage of the aircraft, and one is rigidly connected to the hollow axle while the other is connected to a sleeve inside the hollow axle and is connected to the sleeve through a spring member. In this way the entire cushioning arrangement is housed inside the wheel axle, thus eliminating drag and facilitating mounting and dismounting. — *Patent No. 449728: Ceskomoravska-Kolben-Danek and Co., Ltd.*

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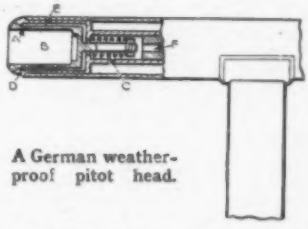
PRESSURE tubes for measuring air speeds are very sensitive to the penetration of water and the presence of a single drop of water may seriously affect the accuracy of the instrument. To prevent water penetrating into the pressure pipe, the pressure tapping point should always be at the forward upper edge of the pressure tube.



A German weather-proof pitot head.

This is provided for in the construction described, where the pressure tapping point A is in the pressure pocket B, which by means of the spring C is held on the seat D. The pressure pocket B can be rotated at will to bring the point A to the highest point, thus making it possible to use the pressure tube in any position in which it can be most conveniently mounted. The pressure is transmitted along channels E and F to the measuring apparatus. Other variations of this construction are shown.—*Patent No. 447667: "Original Bruhn" Taxameter-U Kontrollapparate G.m.b.H.*

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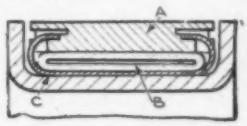
MEANS for securing the friction elements to the flattened inflatable tube used in connection with certain types of aeroplane brake are set out in this specification, these means also acting as "pull-off" springs to bring the friction surfaces away from the drum when the operating fluid is released.

A section of such brake is shown in the illustration. The friction member A is held in contact with the expansible rubber tube B, which usually has a canvas reinforcement, by the spring C-shaped member C, the ends of which fit into recesses provided in the sides of the friction blocks. On release of the fluid pressure, which is used to expand the tube B and so bring the friction faces into contact with the drum, the spring C withdraws these faces from the drum surface and so brings the brakes into an inoperative condition.

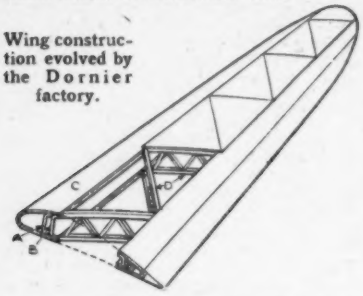
It will be seen that the spring members partially enclose the tube, and by suitable indentations rotational movement is prevented.—*Patent No. 448798: India Rubber, Gutta Percha and Telegraph Works Co., Ltd., and F. J. Tarris.*



An aircraft pneumatic brake patent.

Other People's Ideas (contd.).—

FROM the illustration the wing construction covered by this patent will be seen to consist of a front spar and a rear spar which are connected by torsion-resisting trussed frames of lattice-work form.



Wing construction evolved by the Dornier factory.

The front spar consists of two webs A and B which are of channel section, and these are fastened to the nose C of the wing so as to form a hollow member which has considerable resistance to flexion and torsional stresses. A similar construction is adopted for the rear spar. The two wing spars are connected together by the truss members D, which are arranged obliquely so that with the spars they form triangular spaces.—*Patent No.* 447459: *Dornier Metallbauten.*

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IN the construction of retractable undercarriage described, torsion springs are used in place of the usual resilient strut, and retracting means are provided whereby the tension of the torsion springs is not increased, and thus only the weight of the undercarriage has to be lifted, there being no additional force which would be the case if the torsion springs were further stressed. As the torsion spring itself forms the pivot for retracting the undercarriage, the number of parts is reduced.—*Patent No.* 448983: *Porsche G.m.b.H.*

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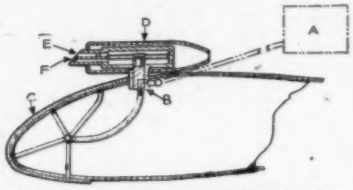
A CONTROL system for brakes is described in which the brakes can be applied equally on both sides of the aeroplane or unequally by means of a rudder control. Several types of application are given, but a typical one is shown.

The arrangement is applicable to fluid pressure brakes. The rudder bar A, in addition to its connections to the rudder, is also connected as shown to two pistons B and C in the control apparatus. In this apparatus there are two other pistons, D and E, operated by toggles by the movement of the cable F, which is connected to a hand lever. G is a reservoir for the fluid, which is led by the pipes H and L to the brakes on either side of the aircraft.

In the position shown in the illustration, there is communication between the two cylinders through the passage J, and therefore no resistance is offered to the movement of the rudder bar, since no braking of any kind is produced, fluid merely passing from one cylinder to the other. Operation of the cable F applies the brakes equally to both sides and at the same time closes passage J, thus isolating the two cylinders. Movement of the rudder bar will now produce unequal braking.—*Patent No.* 448104: *Bendix Aviation Corpn.*

AN apparatus is described which controls the supply of fluid for the prevention of ice formation and which is automatically brought into operation when the conditions are such that ice is likely to form. The system is applicable to supplying the induction system of the engine with hot air when freezing conditions prevail, and also to the supply of anti-freezing liquid to the leading edge of a wing.

Its method of operation in the latter case is shown in the illustration. The anti-freeze liquid is contained in reservoir A and is led by piping through the valve B to an absorbent covering C on the leading edge of the wings. The apparatus D, which controls the valve B, is divided into two compartments by a diaphragm which is connected to the valve member. A stream of air enters these compartments at E and F, the spring F being a very restricted aperture. The air leaves by way of apertures in the rearward end of the compartments.



The de-icing system described in the accompanying paragraph.

When ice-forming conditions exist the small aperture at F is quickly blocked by ice, the pressure in the lower chamber becoming atmospheric and that in the upper chamber remaining higher, the diaphragm moves down and so opens valve B.—*Patent No.* 449532: *A. Swan, A. A. Griffith and W. Helmore.*

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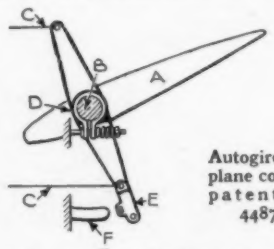
A SPECIAL construction and control means for the aerofoil-section tailplane of a rotating-wing aircraft or autogiro is described which enables the tailplane to



Autogiro tailplane control—patent No. 448705.

exert a greater stabilising influence during steep descents, and thus eliminating the tendency of the tail to lift with the consequent depression of the nose of the aircraft.

The tailplane, which is normally in an approximately horizontal position for forward flight, is capable of being rotated into alignment with the altered direction of airflow that occurs during a steep descent. The tailplane which is shown at A in the illustration is pivoted at B and controlled by cables C C which are connected to a control wheel. Frictional resistance is introduced by the spring-loaded collar D, and further frictional resistance is obtained when the tailplane is in its normal position by member E contacting with fixed projection F. For normal flight the rocking axis of the tailplane passes through the centre of pressure of its aerofoil sections, and thus there is no appreciable turning moment. If the tailplane is set for a steep descent and horizontal flight is then resumed, the centre of pressure moves to the rear and the tailplane automatically tends to assume its horizontal position.—*Patent No.* 448705: *A. G. Coats and R. Hafner.*

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THE subject of Patent No. 447931 is an improved method of mounting a gun in the nose of the fuselage so as not to interfere with the pilot's view or with the streamline form of the fuselage, but at the same time to give the gun a field of fire of almost a full hemisphere.

The nose of the fuselage is formed of a cap-shaped member and is capable of rotation about an axis running fore and aft. Fitting inside this cap is a U-shaped member capable of rotation about a transverse axis. On to this U-shaped member is mounted a gun at a point corresponding to its centre of wind pressure, the method of mounting allowing movement about both horizontal and vertical axes. From the above it will be appreciated that, in addition to the movement provided by this universal joint, the gun can also be given two primary motions, one rotation about a transverse axis of the fuselage, and another about a longitudinal axis.

These give a field of fire extending roughly over a hemisphere.—*Patent No.* 447931: *Fairey Aviation Co., Ltd., and M. J. O. Lobelle and J. C. Trotter.*

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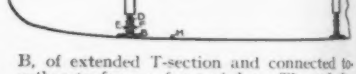
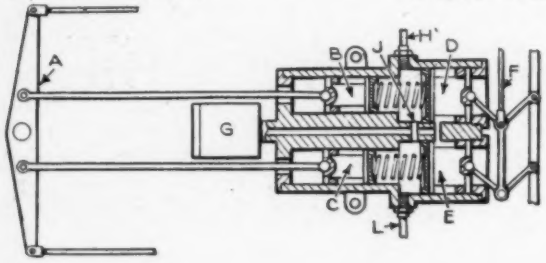
A DESIGN of spars for general use but in particular for wing construction is described, and the first illustration gives a sectional view of the leading edge of a wing. There are two booms, A and

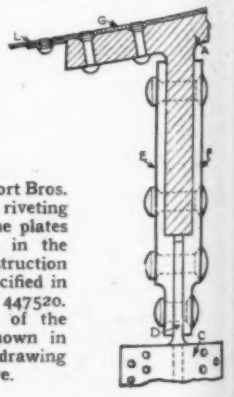


B, of extended T-section and connected together to form a front girder. The tubular bracing member C has riveted in its end an H-section piece of which the central web is extended to form the tab D which is attached to the leg of the T-shaped booms by means of gusset plates E and F.

The method of riveting the booms to the plates G and H is also shown, the construction being such that the rivets do not project into the air stream, but they lie flush with the skin. The method of connecting the shaped plate (L) of the nose of the wing to the plate G and the boom A is likewise indicated.—*Patent No.* 447520: *Short Bros. (Rochester and Bedford) Ltd., and L. Gouge.*



(Left) Details of a hydraulic braking system patented by the Bendix Aviation Corporation.



(Right) Short Bros. method of riveting spars to the plates mentioned in the wing-construction system specified in patent No. 447520. A section of the wing is shown in the small drawing above.

Private Flying

Topics of the Day

Better Take-offs

A FEW weeks ago I suggested that the modern light aeroplane was tending to depart from an ideal involving the ability to take off from any space into which it was possible to enter. Naturally, this idea can only be demanded with discretion, for there are a few good little landing grounds which, with the wind in a certain direction, have a perfectly good approach but a quite impossible exit. However, even if it is necessary to take off across wind in any case, a machine requiring a short run is better and safer.

The question is: How are we, with steadily rising performances, to obtain this necessary feature? The only answer appears to be to use a v.p. airscrew when high performances are demanded. I can think of one or two machines on which the full load take-off is so staggeringly bad that one is frightened even when a medium-sized aerodrome is being used.

No ordinarily experienced owner can gauge the length of the available run before him on a strange aerodrome, and he knows that, if the run is only just sufficient, a small error in the attitude of the machine while gathering speed, or an attempt to pull it up into a premature climb, may result in disaster of the worst kind. Consequently, he refrains from using small aerodromes and the machine's usefulness is correspondingly reduced. I would much rather have a good take-off even if this has been obtained only at the expense of maximum speed and economy of operation.

V.P. Airscrews for Us

FOR the moment the available v.p. airscrews are still too expensive and too heavy to be considered either by the light aeroplane manufacturer or the owner. One or two American types which would in this country be considered as high-powered are so fitted, and the only one—a Smith—which I have actually operated required no particular skill or knowledge of the pilot, and was no more worrying than undercarriage retracting gear. However, it is just one more gadget, and the modern machine is quite complicated enough for the man or woman for whom flying is only part-time occupation.

During the last week or so I have heard of two new designs which might be both cheap and light enough for the smaller aeroplane of the semi-luxury type. Both are being developed or handled in this country and we should hear something more about them within a few months. Certainly, a really simple and, preferably, automatically operated affair will give both designers and owners a little more scope.

I feel that "automaticity" is fairly important provided that this feature can be combined with absolutely reliable operation. It is not likely that the pilot will forget to change to fine pitch before starting his approach, but if he does the situation might be serious if he overshot a small aerodrome and did not realise his error until the very last. Those of us who were at Mildenhall during the preparations for the England-Australia race will never forget the occasion when one of the Comets was brought in either too high or too fast on two occasions and the pilot opened up on coarse pitch when the machine was already more than half way across the aerodrome. The v.p. airscrews then fitted could only be changed to fine pitch while on the ground. Needless to say, the private-owner type of machine would not necessitate the use of an automatic constant speed airscrew—two positions would be ample, since the v.p. airscrew is only valuable in this case as an aid to better take-offs.

Neither must it be imagined that the v.p. airscrew is a positive cure for all evils. There are a number of machines which would not be benefited in a manner which would justify the extra weight and cost, but it would allow those machines with a wide natural speed range to make the most of themselves, and it might also permit the more useful application of devices designed to improve the lift at low speeds. Take-off safety is all a matter of distance covered, and a machine which is airborne at, say, 40 m.p.h., can still be troublesome if the ground acceleration is poor between 30 and 40 m.p.h.

Directional

I HAVE often wondered whether it would be possible to produce a really inexpensive form of directional gyro for the use of the private owner. When flying on a northerly course it is a great relief to be able to fly on a directional instrument which exhibits no lag and yet which is not too sensitive for comfortable travel. On such courses I usually hang on to the turn indicator needle (when this gyroscopic instrument is fitted to a machine) rather than attempt to fly consistently on the compass, but this needle is almost invariably too sensitive and, of course, only shows that the machine is flying straight; a momentary failure to keep the needle central is usually sufficient to put you five degrees or more off-course. If there are any well-defined clouds it is probably more restful to choose one and to fly towards it.

The normal directional gyro is not intended to remain absolutely accurate for much more than a quarter of an hour and must, in any case, be most carefully sprung, since the gyro is freely mounted—as opposed to that in a turn indicator, which is restrained and is allowed motion in only one plane. However, it might be possible to make a directional instrument at a much lower cost if the standard of accuracy required is not very high. I should have no objection to resetting it every five minutes, and if one knew the direction and amount of the precession it would not be necessary to reset it against the compass—a job which requires at least a minute of accurate flying.

INDICATOR.

Private Flying

FROM the CLUBS

Events and Activity at the Clubs and Schools

NORTHAMPTONSHIRE

FLYING was brisk last week. Col. A. R. Liddell and Mr. C. F. Westley completed the time for "A" licence renewal, and Mr. L. R. Warren took a brand new "A." Major G. R. D. Shaw returned from Belgium last Monday week in his B. A. Swallow.

DONCASTER

For the week ending September 4, machines of the Doncaster Aero Club flew 15 hr. 15 min.

REDHILL

Mr. Clive Branson and Mr. Danby have gone solo, and there are four new flying members. Flying time for the week ending Friday, September 4, was 70 hr. 50 min.

MIDLAND

Dr. Linklater has gone solo and Messrs. D. G. Vaughan and G. Gurrie have become members. Last week's flying times were 21 hr. 45 min. dual and 30 hr. 50 min. solo.

YORKSHIRE AVIATION

The total flying time at York and Leeming, the Y.A.S. Aerodromes, for August was 374 hr. 45 min. Dr. Milligan and Mr. Blanchard have become flying members.

ABERDEEN

With the exception of three days, weather during the past fortnight has been perfect for flying and a record number of hours was logged. New flying members include Mr. Sidney Duffus.

SOUTH COAST

In face of mixed weather Club machines flew 45 hr. last week. A lunch party of fifteen flew down from Brooklands last Sunday week. Miss Broad and two passengers have returned from the Hague. New members include Mrs. Macfie and Messrs. Marsden and White.

HANWORTH

New members are Miss T. Biddlecombe and Mr. M. Taylor (both of the National League of Airmen), and Mr. Fujino. Mr. Nigel Watson has passed his "A" licence tests, and Mr. Fowler (Air League) has gone solo. Last week's flying times amounted to 67 hr. 5 min.

BORDER

Mr. F. G. Lundon, of the Royal Singapore Flying Club, has been a guest of the Border Flying Club for five days. Three Club machines took part in the "dawn patrol" at Newcastle last Sunday week and two were successful. The flying total for August was 130 hr. 20 min. New members are Miss Evans and Mr. T. T. Macan.

CAMBRIDGE

Sixty hours' fifteen minutes' flying was logged by Marshall's Flying School, The Cambridge Aero Club, and The University Aero Club during the week ending September 6. Mr. Warrington passed his "A" licence tests, Mr. Lyon went solo, and Mr. Worsdell passed his instructor's course. No flying was possible on the 4th owing to high winds.

BRISTOL

Mr. E. G. Davis went solo on the ninth day after his first flight. Mr. Davis has built a "Pou" and has learned to fly preparatory to taking his own machine into the air. The total flying time for August was 190 hr. and for the week ending September 5, 34 hr. 10 min. Messrs. A. A. Gordon-Cranmer and D. G. Paton have become pilot members.

C. A. S. C.

Members flew 5 hr. last Sunday in spite of adverse weather. There is a proposal afoot to form a further squadron in Kent. Those interested should apply to R. A. Carter, Civil Aviation Service Corps, 19, Berkeley Street, London, W.1.

CANTERBURY

Mrs. Gracie and Messrs. Eady, Frith-Rogers and Buchanan have joined the Club as flying members. Messrs. Hodgkinson and Andress have gone solo, and Messrs. Howard, Frith and Williams have passed their "A" licence tests. Mr. J. Tuckwell, who received his training at Bekesbourne, has obtained his ground engineer's licences and has joined Imperial Airways.

LEICESTERSHIRE

The figure of 178 hr. 25 min. recorded last month stands as a record for any August since the Club started operation in 1929. Mr. A. L. Wykes has gone solo and Miss J. Brassey, together with Messrs. F. R. Wragg, E. M. Frisby and H. W. King, have taken their "A" licences. Four Club machines took part in the Hedon "dawn patrol" on the 23rd, and the following week-end there was night flying at Leicester Airport. Messrs. A. L. Wykes, A. G. Pasley, and J. W. Tomkins have become pilot members.

CINQUE PORTS

The skill of the Club in selecting the only fine week-end of the summer for the International Air Rally was accentuated by the return of the usual conditions during last week. However, all the foreign guests, with the exception of M. and Mme. Filippo, were able to return to their respective countries. These two flew on to Heston, but on their return to Lympne were held up for a night. Flying time for the week was 59 hr., the total naturally being affected by the Rally. New members include Mr. L. S. L. Cotter, Mr. Oyler and son, and Mr. C. I. Wells.

BROOKLANDS

A sudden change in the weather thwarted the efforts of several members to go solo. Messrs. A. W. Saunders and C. W. Roberts have joined the Club; Mr. A. O. Hemus and Mr. Lindsay-Smyth have gone solo; and Messrs. C. W. Andrews and P. J. Urlwin-Smith have taken their "A" licences. Mr. G. C. B. Bernard-Smith, who has been taking an instructor's course, has passed the G.A.P.A.N. examination. The Scott-engined D.H.53, which is being built at the College of Aeronautical Engineering, is nearing completion. The Club sent a machine to Newtownards for the racing last week-end. Mr. B. Hunt has acquired a Puss Moth. On Sunday all the Club machines went to Shoreham for lunch, the "dawn patrol" being cancelled.

LONDON

Last week, during which the flying time was 164 hr. 25 min., Messrs. T. W. Burton and D. Maitland went solo and Mr. W. C. Butler completed the tests for his "A" licence. Mr. D. Berrington won the map-reading competition, Messrs. E. M. Wright and F. J. Bush being second and third respectively. The competition was won by 20 seconds, there being 2 min. 40 sec. between the second and third. During August Club machines flew 731 hr. 5 min., representing a record month total in the history of the Club.

The navigation competition, which was run last week-end, was won by Mr. H. L. N. Davis (3 min. 15 sec. total error), with Messrs. D. J. A. Fletcher and J. Bentley as runners-up with total errors of 5 min. 15 sec. and 7 min. respectively. As will be seen, the competition was very close. A triangular course was used, and the entrants were judged on the relative accuracy of their flown time compared with their estimated time, an average being taken for each leg so that no "making-up" was possible after an error, for instance, on the initial leg.

LULL IN THE STORM: Varied fauna at the Bristol club's garden party last Saturday, which, as related on the next page, suffered severely from the weather. Seen here are one of the Club Swallows, the Bristol 143, an Autogiro, a Drone, and three Harts of No. 501 (City of Bristol) Squadron. The human element is mainly seeking solace in the clubhouse, which, with the Airwork hangar, can be seen in the background. (*Flight* photograph.)

YAPTON

For August the flying time was 246 hr. 50 min., and for the period September 1 to 5, 13 hr. 45 min. Messrs. Hunter and Prentice went to Sywell for their "dawn patrol" on Sunday, but made a mistake in the time and arrived so early that they took part in the defence instead of in the attack. Mr. Donald Shaw is keeping his Fairchild G-EACO with the Club. Mr. John Hunter was successful in passing his examinations in meteorology and navigation for his "B" licence.

NORFOLK AND NORWICH

At an informal supper given to members of the third Public Schools Aviation Camp by camp officials the Noel-Hill Cup was awarded to Mr. P. Gardner, of Imperial Service College, Windsor. Flt. Lt. R. Milne judged Mr. R. Cobley (Marlborough) the winner of the Camp Officers' Trophy. The President's Prize for flying was won by Mr. R. A. Kirkwood (Dover College). Other prizes were won by Mr. P. G. Fletcher (Nautical Training College, Pangbourne), and by Mr. A. Meredith-Owens (Rossall). Members of the Norfolk and Norwich Club put in over 27 hr. flying last week. Mr. J. Beauchamp has become a flying member and Messrs F. R. Davy and T. Manning have qualified for their "A" licences.

Rochester in the Air

ROCHESTER'S Empire Air Week is now in full swing, and displays are being held each day. The final and biggest display of the week will be held on Saturday, and it is hoped that a large number of clubs and manufacturers will send machines. The flying programme begins at 11 a.m.

The Air League's Young Pilots' Fund

AS a result of a ball and appeal eighteen months ago the Air League of the British Empire collected £3,400 for a Young Pilots' Fund from which to help a number of young men to learn to fly who could not bear the whole cost themselves.

Sixty-seven Young Pilots have now gained their certificates; sixty-nine are still under training, and a further twelve have been accepted.

With the training of a further fifty Young Pilots the Fund would normally be exhausted, but there is hope that the work of assistance may continue with the aid of large industrial corporations. The Board of Unilever Limited have made the first step and have offered to contribute £20 to the Air League's Young Pilots' Fund for each member of their staff who wishes to avail himself of the scheme.

The Air League will be glad to send particulars of its scheme to any firm which would like to encourage members of its staff in a similar manner. Enquiries should be addressed to the League at 19 Berkeley Street London, W.1.

The Gliding Week

VERY mixed weather was the lot of the competitors in the B.G.A. gliding competition at Bradwell Edge, Derbyshire, all last week. As already recounted, the opening Saturday was notable for some terrific thermal currents on a completely windless evening; the Sunday, by contrast, presented a boisterous and chilly wind which later approached gale force and grounded even those few who had ventured out.

On the Monday, by contrast again, there was a flat calm and no thermal currents; but the competitors made the best of it by organising an impromptu spot-landing competition, using a Nacelle Dagling (intermediate trainer) launched by winch. Mr. Philip Wills was the winner.

The Tuesday was a really good day, convectional, thermal and cloud currents all being available. Actually, 45 hours' flying was put in by seventeen pilots in fourteen machines. Best performance of the day was by Mr. D. M. Morland in the White Wren, who, making no fewer than fifty "beats" along the three-mile site, remained in the air for 5 hr. 46 min. At one time there were thirteen machines in the air at once.

Conditions the next day were fair, but heavy rainstorms later drove most competitors to earth.

Nothing of any great note happened until Saturday, when the only two cross-country flights of the week were made, one by Mr. Wills to Lincoln (48½ miles) and the other by Mr. E. J. Furlong to Owler Bar, Sheffield (12 miles). The former effort ended in an unavoidable down-wind landing and some damage to the Hjordis. On the same day, Mr. D. Hiscox flew the Kirly Kite in the neighbourhood of Bradwell Edge for 5 hr. 23 min.

The final competition for the team prize brought the meeting to an end on Sunday, Messrs. L. Slater and G. O. Smith winning with an aggregate of 19 hr. 6 min. for the week. Mr. Hiscox, with the Kirly Kite, put up the highest individual aggregate—17 hr. 11 min. The grand total of flying for the meeting was 150 hr. 49 min.

The challenge cups remain "as you were."

Bristol Under the Weather

QUITE what they have done to deserve such treatment one does not know, but the fact remains that last Saturday, when the Bristol and Wessex Club held their garden party in collaboration with the very flourishing Bristol branch of the R.Ae.S., the weather wrecked the proceedings *for the fifth year in succession*. Conditions were not too bad at Bristol's airport at Whitchurch when an arrival competition set the ball rolling early in the afternoon, though the south-west wind was so high that some of the arrivals had more or less to "climb" their aircraft on to the ground, with noses down and throttles well open. Mr. Marsh carried off the sealed-time prize, putting down his C.30 Autogiro nearest the magic moment of 2.3 p.m.

A flight of Harts from No. 501 (City of Bristol) (Bomber) Squadron from Filton put up a very pretty show of formation flying, the very gusty wind apparently not one whit disconcerting the pilots in their close formation work. A solo aerobatic item was contributed by F/O. Pickup.

The weather had apparently discouraged some of the promised visitors from distant points, but there was a very fair muster to give demonstrations. Mr. Macphail put the De Luxe Monospar through its paces; Mr. Marsh showed that it took more than a near-gale to cramp the characteristic style of the C.30; and Mr. Collins, aided by these same zephyrs, extended the Kronfeld Drone over a quite amazing range of ground speeds. Mr Shoesmith showed off the Hillson Praga, performing, among other things, an entertaining bit of swish-tailing during otherwise normal horizontal flight; and Mr. Field-Richards obligingly filled in a gap in the programme with a characteristically dashing display on the Taylor Cub. As a contrast to the small stuff, Flt. Lt. Uwins roared impressively about the cloud-wracked sky under the impulse of the two Aquilas in the Bristol 143—the civil version of the *Britain First*.

It was during these demonstrations that the rain started, in squalls at first and then in a steady downpour; so, except for a height-judging competition in which no fewer than three spectators tied, proceedings out of doors were soon brought to a compulsory standstill, though a few hardy souls did continue joy-riding in one of the Club's two B.A. Swallows or, more cosily, in a Western Airways Dragon piloted by F/O F. A. Cubitt.

Whitchurch is a pleasant spot, and a sunny day would have ensured a show that everyone would have enjoyed. As things were, one sympathised heartily with the Club's secretary, Mr. L. R. Williams, and Mr. Yendall, secretary of the Bristol R.Ae.S., who, with their fellow-enthusiasts, must have put in a lot of hard work to little purpose.

A photograph, taken during one of the comparatively bright intervals, will be found on the previous page.

United Again

THERE could be no greater tribute to the unquestioned fairness and impartiality of those two famous handicappers, Messrs. Rowarth and Dancy, than the fact that they are universally popular among flying people. There is hardly a racing pilot in the country who has not at some time or other pretended to have been outrageously treated by them, but let any "outsider" try to venture the mildest criticism, and these same pilots will rush, as one man, to the defence. A year or two ago, when Wilfred Dancy was transferred to Martlesham, it was feared that the partnership might be broken up, or at any rate that the appearance of these two at every race of any note might no longer be possible. Fortunately, nothing like that happened, and now the team work is likely to become better than ever, as Mr. Rowarth has been promoted from Technical Officer at the R.A.E. to Engineer Officer at Martlesham in place of Sqn. Ldr. H. W. McKenna.

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS — AIR MINISTRY ANNOUNCEMENTS

LONG-RANGE ARTILLERY: The Vickers Wellesley, thanks to the merits of geodetic construction, can destroy targets at an abnormal distance from its base. (*Flight* photograph.)

NOMENCLATURE

Certain Vildebeest aeroplanes now under construction will be fitted with Perseus engines. This form of Vildebeest will be known as Vikdebeest IV.

OFFICERS FROM THE UNIVERSITIES

The undermentioned university candidates have been selected for appointment to permanent commissions in the General Duties Branch of the Royal Air Force:—P. J. C. Canney, Cambridge; J. E. I. Crump, Oxford; J. R. G. Finlayson, Cambridge; J. D. S. Huxley, London; E. H. Jago, London; K. A. Merritt, Oxford; J. D. Ronald, Oxford; D. G. Simmons, Cambridge; W. B. S. Simpson, Cambridge; D. H. G. Tollemache, Cambridge; L. Vincent, Cambridge.

SPECIALIST ARMAMENT COURSE

The undermentioned officers, having successfully completed the specialist armament course at the Air Armament School, Eastchurch, which terminated on July 4, are granted the symbol "A":—Flight Lieutenants: F. W. Dixon-Wright, N. H. Fresson, C. J. Giles, J. Goodhart, N. A. R. Halliday, D. I. P. Macnair, D. W. R. Ryley.

IMPERIAL COLLEGE OF SCIENCE AND TECHNOLOGY

The undermentioned officers, who were awarded the "E*" symbol on successfully completing the specialist "E" Course at Henlow in July, 1935, have successfully completed an advanced course at the Imperial College of Science and Technology, which terminated in June, 1936: Flt. Lts. G. D. Emms and W. F. Pharazyn.

The undermentioned officers also successfully completed this course:—Flt. Lt. W. S. Armstrong, R.A.A.F., and F/O. H. R. Carefoot, R.C.A.F.

THE SASSOON PHOTOGRAPHIC CHALLENGE TROPHY

The entry for the photographic trophy presented by the Rt. Hon. Sir Philip A. G. D. Sassoon, Under Secretary of State for Air, has now been judged. Ten units entered for the competition and the official placings and percentage of marks are as follows:—No. 101 (Bomber) Squadron, Bicester, 92.7; R.A.F. Station, Upper Heyford, 85.0; No. 4 Army Co-operation Squadron, S. Farnborough, 82.8; No.16 Army Co-operation Squadron, Old Sarum, 82.0; R.A.F. Station, Gosport, 81.8; R.A.F. Station, Andover, 77.8; No. 13 Army Co-operation Squadron, Old Sarum, 77.0; School of Naval Co-operation, Lee-on-the-Solent, 75.0; R.A.F. Station, Calshot, 52.0; R.A.F. Station, Mildenhall, 43.0.

The general standard of the photographic flying is considerably higher than in previous years, but the time taken in the ground work for producing and laying down of prints does not show a similar degree of improvement.

STATION FLIGHT, MILDENHALL

The formation of the station flight at Mildenhall and the transfer of the meteorological section of the station flight from Duxford to Mildenhall has been deferred until October 1.

AIR FORCE LIST

The September issue of the *Air Force List* has now been published. It can be purchased (price 3s.) from H.M. Stationery Office at the following addresses: Adastral House, Kingsway, London, W.C.2; 120, George Street, Edinburgh; 2, York Street, Manchester; 1, St. Andrew's Crescent, Cardiff; 15, Donegall Square, Belfast; or through any bookseller.

FLYING ACCIDENTS

The Air Ministry regrets to announce that P/O. Thomas Barry Hunter and A/C.1 Edward George William Lincoln lost their lives in an accident which occurred near Tulkarm, Palestine, on September 3, to an aircraft of No. 6 (Bomber) Squadron. P/O. Hunter was the pilot of the aircraft and A/C. Lincoln the passenger.

Also that Flt. Lt. William Corbet Yale died in the Indian Military Hospital, Fort Sandeman, India, on September 4, as the result of injuries received in an accident which occurred near Fort Sandeman on the same day to an aircraft of No. 31 (A.C.) Squadron. Flt. Lt. Yale was the pilot of the aircraft and L.A/C. John Mumbray, who was injured, was the passenger.

500 VACANCIES MONTHLY FOR AIRCRAFTHANDS

The Air Ministry announces that, owing to the expansion of the Royal Air Force, an entry of 500 aircrafthands will be required each month until further notice. Of these, 150 will be entered for training as armourers and wireless operators and the balance of 350 for general duties as aircrafthands.

The age limit for the first group is seventeen to thirty-two. Previous trade experience is not necessary, but applicants must have received a good general education. The age limits for entry as aircrafthand, general duties, are eighteen to twenty-six, and those selected will have an opportunity, after approximately twelve months' service, for selection for training in one of a number of trades, e.g., fabric worker, storekeeper, fitter's mate, motor driver, &c. On satisfactory completion of this training the pay is increased and the prospects of promotion are improved. Men entered as armourers and wireless operators are enlisted for six years, and aircrafthands, general duties, for seven years; those in the latter category selected for trade instruction are required to extend their engagement to nine years on completion of their training. All candidates are liable for service at home or abroad.

Detailed particulars of entry can be obtained from the Royal Air Force Recruiting Depot, Victory House, Kingsway, London, W.C.2, or from the provincial depots in Glasgow, Birmingham, Liverpool, Manchester, Newcastle, Cardiff, Leeds, Plymouth, and Belfast.

ROYAL AIR FORCE GAZETTE

London Gazette, September 1, 1936

General Duties Branch

The following Pilot Officers on probation are confirmed in rank (June 12):—R. W. Hase, E. C. Eaton, F. C. Hopcroft.

Acting Pilot Officer on probation M. P. Casano is confirmed in rank and graded as Pilot Officer (July 21).

Lt.-Cdr. D. G. F. W. Macintyre, R.N., Flying Officer, R.A.F., relinquishes his temporary commission on return to naval duty (November 27, 1934), (substituted for the notification in the *Gazettes* of December 25, 1934, and Aug. 11, 1936).

Lt. I. C. Rowe, R.N., Flying Officer, R.A.F., relinquishes his temporary commission on retirement from the Royal Navy (September 2).

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

F/O. M. N. Oxford is transferred from Class C to Class A (August 11).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Wing Commanders.—G. H. Boyce, A.F.C., to Headquarters, Coastal Command, Lee-on-the-Solent; for Air Staff duties vice Wing Cdr. A. Durston, A.F.C., 25.7.36. C. E. W. Lockyer, to Cambridge University Air Squadron; for duty as Chief Instructor vice Group Capt. F. E. P. Barrington, 21.8.36. A. Durston, A.F.C., to Headquarters, Coastal Area, Lee-on-the-Solent, 21.8.36. F. J. Vincent, D.F.C., to No. 206 (G.R.) Squadron, Bircham Newton; to command, 13.7.36. R. H. G. Neville, O.B.E., M.C., to Headquarters Armament Group, Eastchurch, for Air Staff duties, 27.8.36. E. R. Vaisey, to Home Aircraft Depot, Henlow; for Administrative duties vice Wing Commander J. S. T. Fall, D.S.C., A.F.C., 25.8.36.

Squadron Leaders.—H. J. Collins, to Headquarters, Coastal Command, Lee-on-the-Solent; for Personnel Staff duties vice Sqn. Ldr. S. D. Macdonald, D.F.C., 31.8.36. E. Thornton, to R.A.F. Station, Hucknall, 21.8.36, to command. C. A. Bouchier, O.B.E., D.F.C., to No. 54 (F) Squadron, Hornchurch; to command, 23.8.36.

Flight Lieutenants.—J. E. W. Bowles, to Aeroplane and Armament Experimental Establishment, Martlesham Heath, 24.6.36. J. S. Dewar, to Aeroplane and Armament Experimental Establishment, Martlesham Heath, 23.6.36. R. H. W. Empson, to R.A.F. Station, Driffield, 12.8.36. J. G. Franks, to R.A.F. Station, Upper Heyford, 19.8.36. C. F. H. Grace, to No. 65 (F) Squadron, Hornchurch, 19.8.36. C. I. A. Jackson, to No. 1 Flying Training School, Leuchars, on appointment to a temporary commission on being seconded from the Army, 26.7.36. G. Bartholomew, to Central Flying School, Upavon, 16.8.36. E. S. C. Davis, A.F.C., to Headquarters, Coastal Command, Lee-on-the-Solent, 24.8.36. V. D. Morshead, to No. 1 School of Technical Training (Apprentices), Halton, 27.8.36. H. L. M. Glover, to No. 24 (C) Squadron, Hendon, 1.8.36. F. S. Gardner, to No. 1 Flying Training School, Leuchars, 19.8.36. C. I. A. Jackson, to No. 4 (Army Co-operation) Squadron, South Farnborough, 20.8.36.

Flying Officers.—F. B. Chapman, to R.A.F. Station, Gosport, 26.8.36. J. C. Taylor, to No. 821 (F.S.R.) Squadron, 24.8.36.

Pilot Officers.—R. N. Smith, to No. 4 (Army Co-operation) Squadron, South Farnborough, 12.8.36. N. M. Hall, to No. 23 (F) Squadron, Biggin Hill, 19.8.36. J. M. Thompson, to No. 151 (F) Squadron, North Weald, 4.8.36. D. M. H. Craven, to No. 151 (F) Squadron, North Weald, 4.8.36.

The undermentioned are posted to R.A.F. Depot, Uxbridge, on appointment to short service commissions with effect from 21.8.36:—H. C. Daish, H. I. Edwards, T. F. Harvey, A. L. Pitfield, A. F. M. Sisley, R. A. McL. Watson, and W. C. Williams.

Acting Pilot Officers.—K. H. Savage, to No. 151 (F) Squadron, North Weald, 4.8.36.

The undermentioned are posted to the Units shown with effect from 16.8.36:—R. S. Allen, to No. 7 (B) Squadron, Finningley. J. E. Baskerville and A. A. N. Breckon, to No. 10 (B) Squadron, Boscombe Down. F. R. C. Fowle, H. Y. Lawrence, and M. C. Wells, to No. 15 (B) Squadron, Abingdon. A. Beck, A. A. Dinot, J. B. Flowerdew, and R. J. Oxley, to No. 18 (B) Squadron, Bircham Newton. E. P. Mortimer, to No. 40 (B) Squadron, Abingdon. R. H. H. L. Oliphant, to No. 54 (F) Squadron, Hornchurch. S. M. Bird and R. E. Lovett, to No. 56 (F) Squadron, Duxford. J. B. Stewart, to No. 99 (B) Squadron, Mildenhall. D. R. Stanley-Adams, C. D. Tomalin, and R. A. Weeks, to No. 151 (F) Squadron, North Weald. F. C. Stibbard and K. T. Thompson, to No. 214 (B) Squadron, Andover. J. F. H. Weston, to School of Army Co-operation, Old Sarum. R. H. Warcup, to School of Air Navigation, Manston. D. T. St. H. Dawes, J. M. W. Savory, K. M. W. Savory, to No. 7 Flying Training School, Peterborough, with effect from 31.7.36. J. Avent, H. R. Bickerstaff, J. B. J. Boardman, G. R. Brady, D. F. H. Brown, H. D. Card, S. G. Cooper, R. C. Cox, A. A. Devany, J. Ellis, S. Gemmell, R. S. Illingworth, R. B. Langlois, A. M. McKenzie, A. C. MacLachlan, H. G. Marriott, F. T. May, S. C. Pendred, T. G. Robertson, G. F. Rodney, D. D. Rogers, G. E. Saddington, W. S. L. Smallman, D. C. Stapleton, G. P. Westrop Bennett, E. T. Williams, all to No. 7 Flying Training School, Peterborough, with effect from 4.8.36.

The undermentioned are posted to No. 4 Flying Training School, Abu Sueir, Egypt, with effect from 19.8.36:—J. F. H. Booth, B. Brooke, A. R. Cooper, D. M. Doran, J. S. Douglas-Cooper, J. S. Dunlevie, L. H. Hunt, R. H. McClatchey, B. A. Miller, W. H. Powdrell, R. H. Rice, G. V. T. Shaen-Carter, G. E. Watkins.

Accountant Branch

Flight Lieutenant.—K. Fraser, to R.A.F. Station, Scampton, 27.8.36.

Flying Officer.—F. H. Shutt, to No. 101 (B) Squadron, Bicester, 24.8.36.

Pilot Officer.—C. W. S. Jones, to R.A.F. Station, Aldergrove, 18.8.36.

Medical Branch

Squadron Leader.—T. R. S. Thompson, to R.A.F. Station, Northolt; for duty as Medical Officer, 24.8.36.

Flight Lieutenant.—G. A. M. Knight, to Central Medical Establishment, London, 28.8.36.

Flying Officer.—R. S. B. McClean, to R.A.F. Station, Pembroke Dock, 9.8.36.

The D.H. 92 Abandoned

THE South Africa Race will be poorer by one entry, and a most interesting entry at that, for the De Havilland Company announces that the design of the D.H.92 is to be discontinued, and that this experimental type will not be put into production.

It is stated the development of the four-engined Albatross, important contracts contributing to the expansion of the Royal Air Force, and other urgent activities impose a heavy load on certain sections of the Company's organisation, making it impossible to devote the personnel and time necessary for the early production of the Dolphin—the type-name chosen for the ninety-second De Havilland design.

The manufacture and technical development of the Dragonfly, the Dragon Rapide, and the D.H.86A will, of course, be continued at any rate of output required to meet the demands of air transport operators, and the development of new commercial types will follow the completion of the Albatross.

Who's Who

"Who's Who in British Aviation," 6s., Bunhill Publications, Ltd., 2, Bloomsbury Place, London, W.C.2.

IN delaying publication of the current edition of this invaluable work until some measure of stabilisation had been achieved in the present transitory state of the aircraft industry and R.A.F., the publishers have taken a wise course. Lt.-Col. Lockwood Marsh and Mr. Ellis Wood, the editors, are to be complimented on the new volume and are not entirely to be blamed for a number of small errors which undoubtedly exist but which can hardly be avoided in an undertaking of this nature where there are over 1,200 biographical notices alone, and where press day must come quite a time before copies are in the hands of the industry. Perhaps the most useful way of indicating the value of the book is to quote a typical biographical note from the current issue:—

> BULMAN, Flight Lieut. Paul Ward Spencer, M.C., A.F.C., F.R.Ae.S., R.A.F.O.; Technical Adviser and Chief Test Pilot to Hawker Aircraft, Ltd. b. Luton, 8 April 1896; R.Ae.C. Av. Certif. No. 4727; formerly test pilot at R.A.E., Farnborough, 1919-25; pilot of winning machine in the *Daily Mail* Light Aeroplane Competition, Lympne, 1926. Club: R. Aero. Add.: 34, Lovelace Gardens, Surbiton, Surrey. T.: Kingston 6272 and Elmbridge 4248.

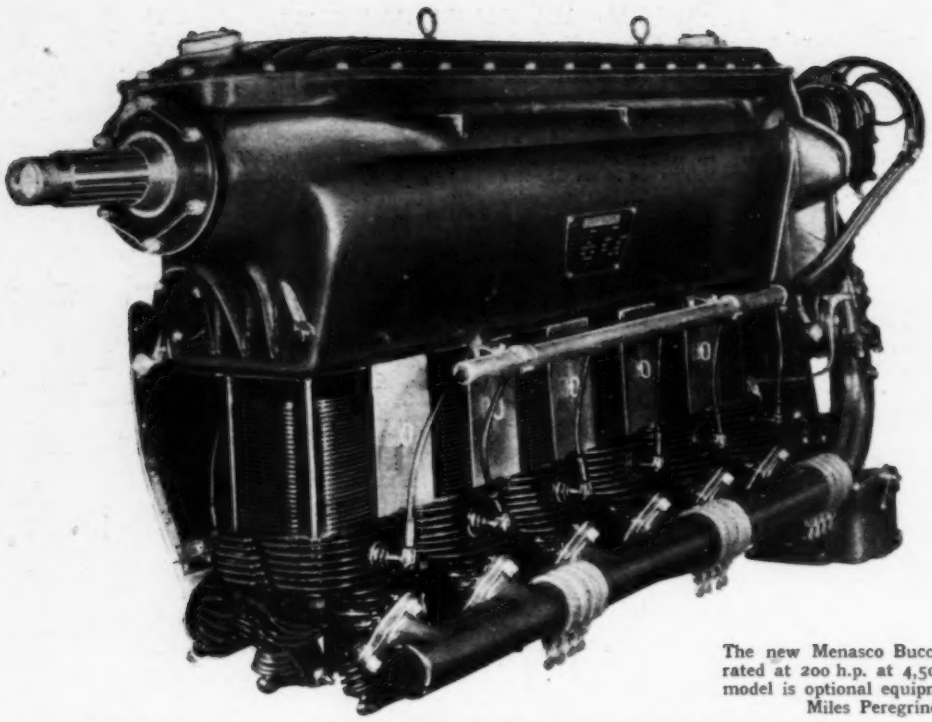
All the usual appendices giving information on companies, societies, schools, periodicals and the like are retained.

Carnet Holders—N.B.

THE Royal Aero Club, in an important notice to holders of carnets, points out that the embargo which was recently placed on the issue of carnets is withdrawn, and they will now be issued as heretofore.

At the same time it is emphasised that the use of carnets for the export of aircraft from Great Britain destined for Spain *is a breach of the privileges of the carnet system and is forbidden.*

The Club states that it will take serious action against holders of carnets who abuse the carnet régime and thus act in a manner prejudicial to the interests of the aviation community.



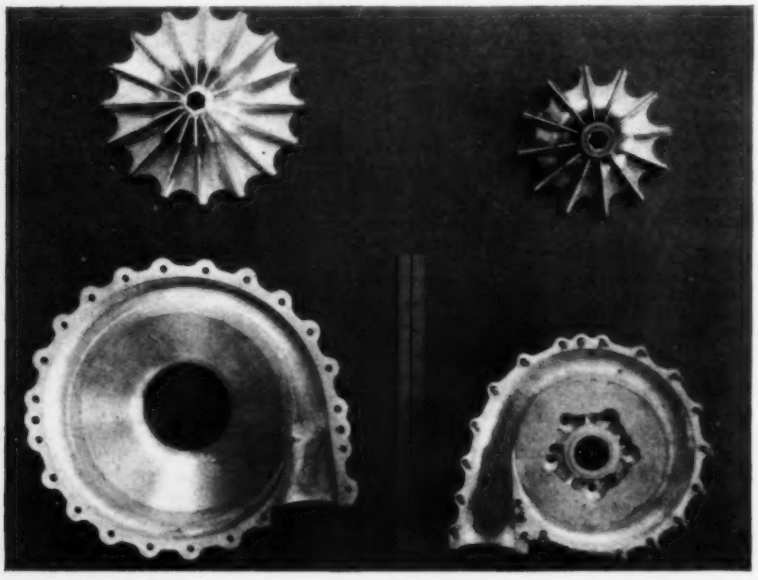
The new Menasco Buccaneer B6S, rated at 200 h.p. at 4,500 ft. This model is optional equipment on the Miles Peregrine.

CIVIL SUPERCHARGING

"Blown" In-lines by Menasco : 150 and 200 h.p. Models : Licence Obtained by Phillips and Powis

ONE type of engine which this country lacks at the moment is a light supercharged model suitable for private and commercial operation. Although British designers have done most of the spadework in the development of the light four- and six-in-line units, they have left it to American and French builders to apply supercharging, and thereby are undoubtedly handicapping themselves in the foreign market.

But that is not to say that supercharged engines of those layouts will not become available over here, for Phillips and Powis Aircraft, Ltd., have secured the manufacturing licence for all current engines produced by the Menasco Manufacturing Company, of Los Angeles, and to the range of this company have lately been added two supercharged models known as the Pirate C_4S and the Buccaneer B6S. Their respective ratings are 150 h.p. at 2,260 r.p.m. at 3,000 ft., and 200 h.p. at 2,250 r.p.m. at 4,500 ft.



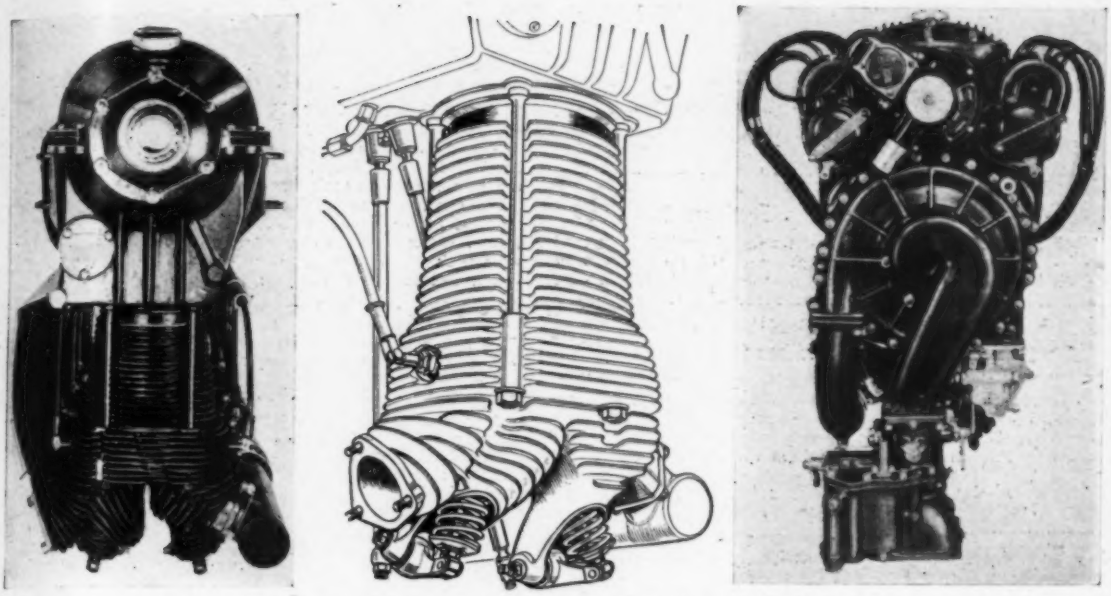
A comparison between the superchargers for the four- and six-cylinder Menascos.

So far, Menasco engines have not been familiar sights in this country, although their popularity among private owners in the U.S.A. and their victories in the American National Air Races (during which practically no special measures were taken to increase performance other than operation at higher r.p.m. than recommended for normal use) have frequently been recorded in *Flight*.

The Tugan Aircraft Company, of Australia, have specified Buccaneer B6S engines for their new Gannet monoplane (formerly known as the Codock) and it is understood that similar power plants will be offered as optional equipment for the new Miles Peregrine.

In general the new engines are similar to the naturally aspirated Menasco types which have preceded them and an inspection of one unit lately shipped to this country gives an impression of high-class workmanship and sound layout.

The supercharger and all accessories are grouped at the rear and have been arranged with a view to easy access. The crank case is generously ribbed and



From left to right: A view showing the frontal area of the supercharged Pirate, a sketch revealing features of Menasco cylinder construction, and the supercharger end of the Buccaneer.

the crankshaft is carried on five main bearings in the four-cylinder engine and on seven in the larger type. In each case a ball thrust bearing locates the crankshaft against thrust.

Pistons are of the full-skirt and "waffle-headed type," i.e., with ample cross-ribbing beneath the head to give strength and assist heat dissipation. The gudgeon pins float in both the connecting rod and piston, being located by end buttons.

Although nickel-iron cylinders are standard, steel ones are optional, and effect a saving in weight. The heads are held to the cylinder and through to the crank case by long nickel-steel studs and can be removed by detaching four nuts and disconnecting the intake manifold. They are cast from aluminium alloy and each has one inlet and one exhaust valve, spread laterally to provide ample cooling area for the head itself and generously finned.

Magneto ignition is standard, but battery ignition is optional.

The centrifugal supercharger is of Menasco design and manufacture and both engines incorporate a special "cushion" in the supercharger gear train which permits direct drive without the provision of a slip clutch.

Although the construction of crank cases is similar for both engines the four-cylinder type is split on the centre line of the crankshaft, major stresses being carried through the lower casing, the upper one serving as a cover, whereas that for the B6S is in one piece with a cover plate. In the six-cylinder engine the mounting ledge is cast integral with the crank case, but the C4S has separate mounting legs.

Specifications are as follows:—

	Menasco "Pirate" Model C4S	Menasco "Buccaneer" Model B6S
Type	4-cylinder, air cooled, in-line, inverted	6-cylinder, air cooled, in-line, inverted
Bore	4¼ in.	4¼ in.
Stroke	5½ in.	5½ in.
Displacement	363 cu. in.	489 cu. in.
Compression ratio	5.5 : 1	5.5 : 1
Supercharger ratio	9.6 : 1	8.75 : 1
H.P. (Dept. of Commerce rating).	150 at 3,000 ft. at 2,260 r.p.m.	200 at 4,500 ft. at 2,250 r.p.m.
Ignition	2 Robert Bosch; Edison-Splitford, or Scintilla magnetos	2 Robert Bosch magtos.
Carburation	1 NA-R5 Stromberg	1 NA-R7 Stromberg
Fuel consumption	.56 lb./h.p. hr.	.56 lb./h.p. hr.
Oil consumption	.010 lb./h.p. hr.	.018 lb./h.p. hr.
Dry weight (without air scoop, fuel pump or air-screw hub)	305 lb.	415 lb.

Capt. A. S. Keep

HIS many friends in the industry will be interested to learn that Capt. A. S. Keep has joined Air Travel, Ltd., at Gatwick Airport, the aircraft repair business operated by Mr. Fred Holmes and Capt. A. N. Kingwill. The firm, incidentally, is now busy on sub-contract work and has installed heat-treatment plant and the appropriate tools.

Scott's Companion

AN omission in the R.Ae.C.'s table of entries for the Schlesinger Race, published last week, was the name of Mr. Giles Guthrie, son of Sir Connop Guthrie (whose Vega Gull won this year's King's Cup Race) as co-pilot with C. W. A. Scott in that same machine. Mr. Guthrie has had considerable experience with the Vega, having made a number of Continental tours.

An Important "Met" Appointment

IT is announced that Mr. R. A. Watson Watt, B.Sc., F.Inst.P., M.I.E.E., F.R.Met. Soc., has been appointed superintendent of the Air Ministry Research Station, Bawdsey Manor, Suffolk.

Mr. Watson Watt, who is 44 years of age, has been superintendent of the radio department of the National Physical Laboratory, an appointment which he has resigned on his transfer to the Air Ministry.

After graduating with special distinction as a B.Sc. (Engineering) at St. Andrews University, Mr. Watson Watt began his Civil Service career in the Meteorological Office and later was appointed superintendent of the Radio Research Stations of the Department of Scientific and Industrial Research at Aldershot and Slough.

He became superintendent of the radio department of the National Physical Laboratory when it was formed in 1933. In this post he has been responsible for an increasing amount of important work for the Air Ministry, especially in connection with D/F equipment and beacons. His present appointment arises from a decision by that Department to establish a research station to continue this work.

A Pocket C.P. Airscrew

THE De Havilland people have produced an extremely ingenious little cardboard working model which illustrates the operation of the D.H. controllable-pitch airscrew, showing both the exterior and interior construction. Members of the industry, ground engineers, and others with good reason to be interested are invited to apply for one of these interesting little gadgets to the company's airscrew works at Stag Lane, Edgware, Middlesex.

THE INDUSTRY

Adding to the Gaiety

ORGANISERS of air displays will be among those interested in a booklet issued by J. T. Dobbins, Ltd., of Crown Mills, Charlton Place, Ardwick Green, Manchester, 1, who are specialists in flags, bunting and such outdoor decorations.

Electrical Measuring Equipment

"MINIATURE Measuring Instruments" and "Industrial Measuring Instruments" are the titles of two very detailed catalogues recently issued by the General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.

Furnace Thermometers

REMOTE thermometers, both direct-reading and recording, for use in connection with works' furnace equipment, are specialities of the Cambridge Instrument Co., Ltd., 45, Grosvenor Place, London, S.W.1, and two folders recently issued by the firm deal in detail with the latest types.

For Transport Fleets

EXECUTIVES of aircraft firms which operate motor transport fleets will be interested in a folder dealing with a new range of equipment that has been introduced primarily for transport fleet lubrication with Texaco "Marfak" lubricant. Copies are obtainable from Tecalemit, Ltd., Great West Road, Brentford, Middlesex.

Ubiquitous Aluminium

OF a non-technical nature, but containing a great deal of interesting information, a new booklet produced by the British Aluminium Co., Ltd., (Adelaide House, King William Street, London, E.C.4) deals with the diverse uses of aluminium in scores of industries. It is entitled "Aluminium: Production, Properties and Applications."

Stormy Petrels?

COVENTRY AERO ENGINES AND COMPONENTS, LTD., was the title of a new company registered on May 25. At the time the names of the first directors were not stated. *Flight* now learns that an official announcement is to be made to-day or to-morrow, and that the company will manufacture in this country various types of the French Lorraine engine, water-cooled and air-cooled.

Elektron Data

SINCE the "Elektron Magnesium Alloy" handbook issued by Sterling Metals, Ltd., first appeared the development and scope of heat treated magnesium castings has increased very considerably, and the company has, therefore, prepared a data sheet for use in conjunction with the handbook. This sheet gives a comparison between the "as cast" and heat treated alloys and includes the D.T.D. numbers of the new specification. It is obtainable from Sterling Metals, Ltd., Foleshill, Coventry.

Metal Pre-treatment

ENTITLED "Pre-Treatment for Metal Surfaces," a new booklet has been issued by Nobel Chemical Finishes, Ltd., Millbank, London, S.W.1. It should interest all constructors who find themselves concerned with the problem of adhesion of paints, lacquers and other finishes—first, as announcing an extension of the company's technical service into the sphere of metal pre-treatment, and secondly, as giving full details of a range of products and processes developed to solve the common problems of metal finishing. These include the use of A.C.P. "Lithoform" for the pre-treatment of galvanised iron, zinc and zinc base alloys *in situ*, and of A.C.P. "Granodine" 31 for the pre-treatment of components of the same materials, as well as cadmium-plated surfaces, in mass production work: and also of A.C.P. "Electro-Granodine" 30 and "Cromodine" for iron and steel pre-treatments, and A.C.P. "Deoxidine" for preparing and cleaning all iron and steel surfaces prior to painting.

Oil Under Stress

SILVERTOWN LUBRICANTS, LTD., commenting on a paragraph in *Flight* of July 27 regarding the durability of Bristol engines used by the Middle East, Iraq and Far East Commands of the Royal Air Force, remark that this reference is also a tribute to their P.4 aero engine oil.

For the third consecutive year, they state, this oil has been adopted for the total overseas requirements of the Air Ministry. Silvertown oil is also used by the air forces of countries with such widely varied climatic conditions as South Africa, India, Latvia and Norway.

"R. and M.s" in New Guise

THE Aeronautical Research Committee announces that it has been considering the style and format of the "Reports and Memoranda" (commonly known as "R. and M."), which were criticised at the British Aircraft Conference held last year. They have now decided, with the concurrence of H.M. Stationery Office, to publish them in a new form which will be similar to that adopted by the Royal Society for their Philosophical Transactions (12in. by 9½in. Royal Quarto reduced). The new series of publications will be issued shortly and will apply to all reports dated later than March this year.

The A.R.C. has also decided to issue its annual report to cover a calendar instead of a financial year. The next report will be issued early next year and will, therefore, cover a longer period than the normal twelve months.

AERONAUTICAL PATENT SPECIFICATIONS

(The numbers in brackets are those under which the Specifications will be printed and abridged, etc.).

(Published September 10, 1936.)

4611. THOMPSON BROS. (BILSTON), LTD., THOMPSON, H. J., and MERRONS, J. W.: Tanks for use more especially in supplying lubricating oil to aircraft (451,784).

5107. AUTOMOTIVE PRODUCTS CO., LTD., and BROWN, F. V.: Hydraulically actuated apparatus and controls, particularly for aircraft (452,047).

6103. MALCOLM, A.: Aircraft (452,053).

13505. RAMSBOTTOM, J. E., LOCKSPEISER, B., and STEWART, C. J.: Aircraft and other vehicles (451,879).

15946. GLOVER, W. G.: Launching and beaching of aircraft (451,883).

5012. POTEZ, H. C. A.: Cowling construction for aircraft engines (451,918).

8111. SPERRY GYROSCOPE CO.: Wireless control systems for dirigible craft (451,841).

12183. JACKSON, P. R. (Sperry Gyroscope Co.) Wireless control systems for aeroplanes and like aircraft (451,842).

23808. SPERRY GYROSCOPE CO.: Gyro control systems for dirigible craft (451,843).

25075. JACKSON, P. R. (Sperry Gyroscope Co.): Automatic pilot systems for aircraft (451,844).

28031. JACKSON, P. R. (Sperry Gyroscope Co.): Wireless control systems for aeroplanes and like aircraft (451,845).

PUBLICATIONS RECEIVED

Aero Engines, by A. N. Barrett. Aeronautical Engineering Series, Ground Engineers. Price 3s. 6d. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2.

International Index to Aeronautical Technical Reports, 1935. Prepared by the Society of British Aircraft Constructors. Price 5s. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2.

NEW COMPANIES

In the notes below, for reasons of space, the "objects" of new companies are usually somewhat abbreviated.

TECHNICAL IMPROVEMENTS LIMITED, was registered as a private company on September 2, with a nominal capital of £1,000 in £1 shares. The objects are to adopt two agreements (1) with La Bougie B.G. and (2) with Airco Ltd., being the schedules to a promotion agreement dated August 17, 1936, between La Bougie B.G., Consolidated Rubber Manufacturers Ltd., and Airco Ltd., and to carry on the business of manufacturers, importers and exporters of and dealers in products employed in conjunction with internal-combustion engines. The first directors are:—Bernard Delarl, John P. Halpin, Airco, Ltd., 3, St. James's Square, S.W.1. The registered office is at 3, St. James's Square, S.W.1.

INCREASES OF CAPITAL

SCOTTISH AIRCRAFT AND ENGINEERING COMPANY LTD., (Shell-Mex House, London, W.C.2.). The nominal capital has been increased by the addition of £249,900 beyond the registered capital of £100. The additional capital is divided into 999,600 ordinary shares of 5/-. Each existing £1 ordinary share is sub-divided into four of 5/-.

This private company was registered on June 18, 1936. No list of directors was on the file to September 3, but the resolution of August 24 was signed "Percy Reed, Chairman."